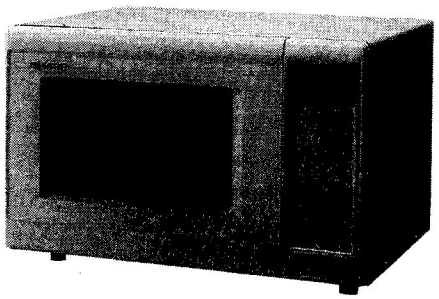
SHARP SERVICE MANUAL

S0314R3SA5PV/

MICROWAVE OVEN



MODEL R-3SA5

In interests of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.

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SHARP CORPORATION

SERVICE MANUAL

SHARP

MICROWAVE OVEN

R-3SA5

GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

CAUTION
MICROWAVE RADIATION

Service engineers should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured. Never operate the device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

WARNING

Never operate the oven until the following points are ensured.
(A) The door is tightly closed.
(B) The door latches and hinges are not defective.
(C) The door is not deformed or warped.
(D) There is not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service engineers.

SHARP CORPORATION

OSAKA, JAPAN

PRODUCT SPECIFICATIONS
GENERAL INFORMATION
APPEARANCE VIEW
OPERATING SEQUENCE
FUNCTION OF IMPORTANT COMPONENTS
SERVICING AND TROUBLESHOOTING CHART
TEST PROCEDURE
TOUCH CONTROL PANEL ASSEMBLY
COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE
MICROWAVE MEASUREMENT
WIRING DIAGRAM
PARTS LIST

PRODUCT DESCRIPTION

SPECIFICATION

ITEM	DESCRIPTION
Power Requirements	220-230 Volts 50 Hertz Single phase, 3 wire earthed
Power Consumption	1060 W Approx. 5.0 Amperes
Power Output	700 W nominal of RF microwave energy (measured by method of IEC 705) Operating fequency 2450 MHz
Case Dimensions	Width 450 mm Height 295 mm including foot Depth 361 mm
Cooking Cavity Dimensions	Width 285 mm Height 178 mm Depth 313 mm
Turntable diameter	272mm
Control Complement	Touch Control System Clock (1:00 - 12:59 or 0:00 - 23:59) Timer (0 - 99 minutes 90 seconds) Microwave Power for Variable Cooking Repetition Rate; HIGH ..... Full power throughout the cooking time MEDIUM HIGH ..... approx. 70% of FULL Power MEDIUM ..... approx. 50% of FULL Power MEDIUM LOW ..... approx. 30% of FULL Power LOW ..... approx. 10% of FULL Power AUTO MINUTE pad EASY DEFROST pad NUMBER pads POWER LEVEL pad AUTO START/CLOCK pad LESS, MORE pads START pad STOP/CLEAR pad
Set Weight (Approx.)	14 kg

GENERAL INFORMATION

WARNING

THIS APPLIANCE MUST BE EARTHED

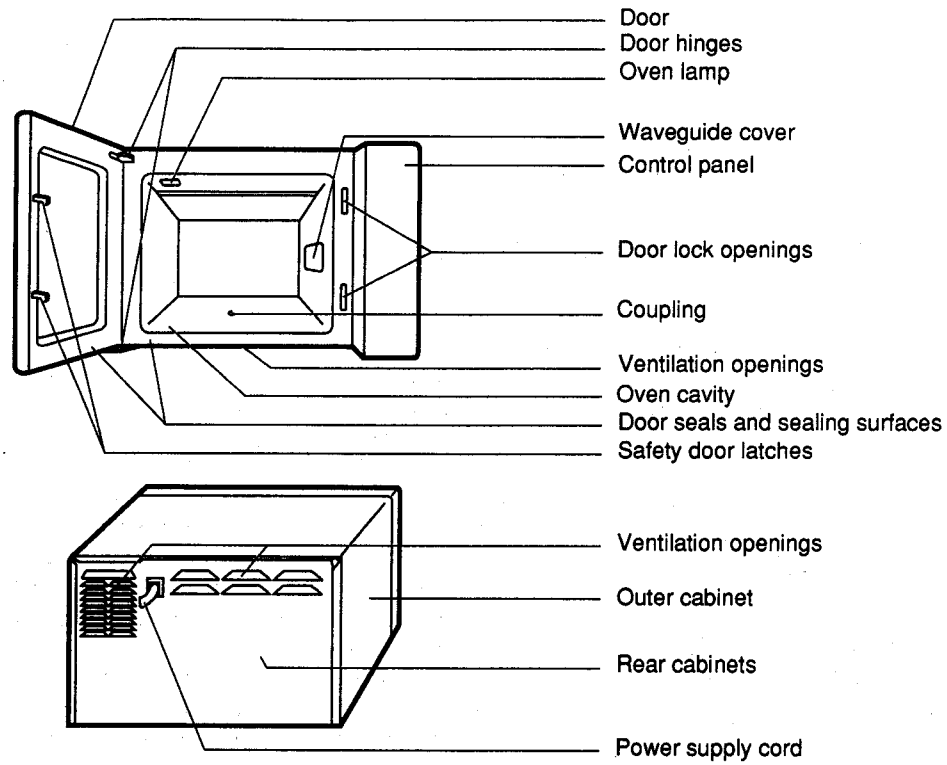
IMPORTANT

THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

GREEN-AND-YELLOW	: EARTH
BLUE	: NEUTRAL
BROWN	: LIVE

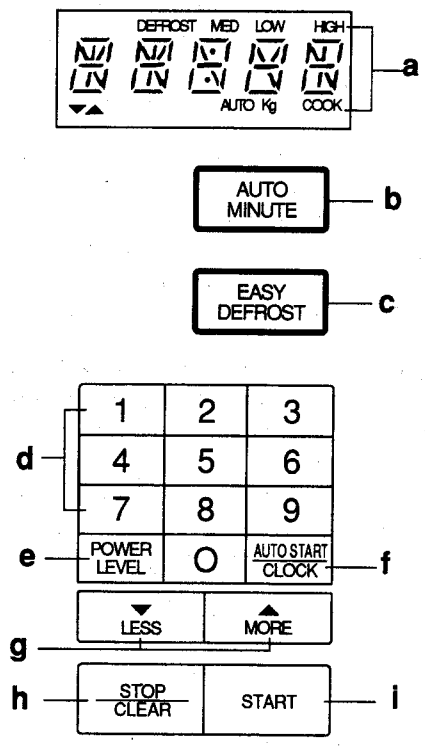
APPEARANCE VIEW

OVEN



CONTROL PANEL

a. Indicator
b. AUTO MINUTE PAD
Press once to cook for 1 minute at HIGH or increase by 1 minute multiples each time this pad is pressed during cooking.
c. EASY DEFROST PAD
Press to defrost meat by entering weight
d. NUMBER PADS
Press to enter cooking times, clock time or weight.
e. POWER LEVEL PAD
Press to select microwave power setting.
If not pressed, HIGH is automatically selected.
f. AUTO START/CLOCK PAD
Press to set clock or Auto Start time.
g. LESS (▼), MORE(▲) PADS
Press to increase/decrease the time in one minute increments during cooking or to alter the doneness for the Easy Defrost modes.
h. STOP/CLEAR PAD
Press to clear during programming.
Press once to stop operation of oven during cooking; press twice to cancel cooking programme.
i. START PAD
Press to start oven after setting programmes.



OPERATION SEQUENCE

OFF CONDITION

Closing the door activates all door interlock switches (1st. latch switch, 2nd. latch switch and stop switch).

IMPORTANT
When the oven door is closed, the monitor switch contacts (COM-NC) must be open. When the microwave oven is plugged in a wall outlet, rated voltage is supplied to the point A3+A5 in the control unit.

Figure O-1 on page 27

1. The display flashes "88:88".
2. To set any programmes or set the clock, you must first touch the STOP/CLEAR pad.
3. " : " appears in the display and the time counts up every minute.

NOTE: When the oven door is opened, the oven lamp comes on at this time.

MICROWAVE COOKING CONDITION

HIGH COOKING

Enter a desired cooking time with the touching NUMBER pad and start the oven with touching START pad.

Function sequence Figure O-2 on page 27

CONNECTED COMPONENTS	RELAY
Oven lamp, Fan motor, Turntable motor	RY1
Power transformer	RY2

1. Rated voltage is supplied to the primary winding of the power transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
2. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltage doubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
3. The 2450 MHz microwave energy produced in the magnetron generates a wave length of 12.24 cm. This energy is channelled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
4. When the cooking time is up, a signal tone is heard and the relays RY1+RY2 go back to their home position. The circuits to the oven lamp, power transformer, fan motor and turntable motor are cut off.
5. When the door is opened during a cook cycle, the switches come to the following condition.

		CONDITION	
SWITCH	CONTACT	DURING COOKING	DOOR OPEN (NO COOKING)
1st. latch switches	COM-NO	Closed	Open
2nd. latch switch	COM-NO	Closed	Open
Monitor switch	COM-NC	Open	Closed
Stop switch	COM-NO	Closed	Open

The circuits to the power transformer, fan motor and turntable motor are cut off when the 1st. latch switch, 2nd. latch switch, and stop switch are made open. The oven lamp remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relay RY1 stays closed. Shown in the display is the remaining time.

6. MONITOR SWITCH CIRCUIT
The monitor switch is mechanically controlled by oven door, and monitors the operation of the 1st and 2nd. latch switches.

6-1 When the oven door is opened during or after the cycle of a cooking program, the 1st. latch switch and 2nd. latch switch must open their contacts first.
After that the contacts (COM-NC) of the monitor switch can be closed and then contacts of stop switch can be open.

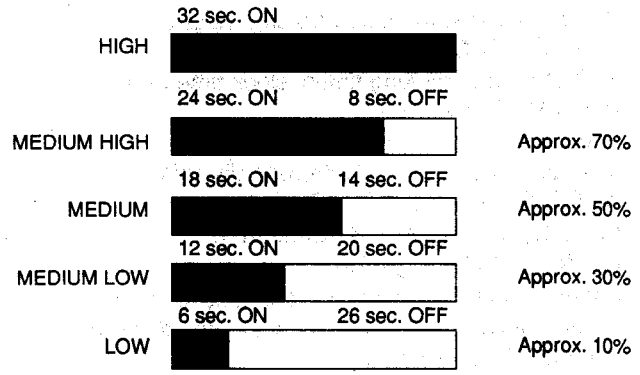
6-2. When the oven door is closed, the contacts (COM-NC) of the monitor switch must be opened and contacts (COM-NO) of the stop switch must be closed first. After that the contacts of the 1st. latch switch and 2nd. latch switch are closed.

6-3. When the oven door is opened and the contacts of the 1st. latch switch, 2nd. latch switch remain closed. The fuse M6.3A will blow, because the monitor switch is closed and a short circuit is caused.

MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW COOKING

When the microwave oven is preset for variable cooking power, the line voltage is supplied to the power transformer intermittently within a 32-second time base through the relay contact which is coupled with the current-limiting relay. The following levels of microwave power are given.

SETTING;.



NOTE: The ON/OFF time ratio does not exactly correspond to the percentage of microwave power, because approx. 2 seconds are needed for heating up the magnetron filament.

FUNCTION OF IMPORTANT COMPONENTS

DOOR OPEN MECHANISM

The door can be opened by pushing the open button on the control panel. When the open button is pushed, the switch lever on the latch hook is moved upward, operating the latch head. The latch head is moved upward, and released from the latch hook. Now, the door can be opened.

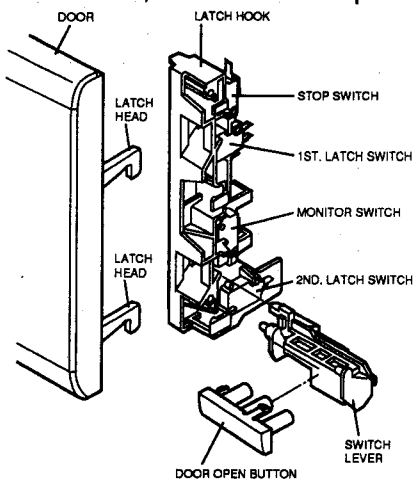


Figure D-1. Door Open Mechanism

1ST. LATCH SWITCH, 2ND. LATCH SWITCH AND STOP SWITCH

1. When the oven door is closed, the contacts (COM-NO) must be closed.
2. When the oven door is opened, the contacts (COM-NO) must be opened.

MONITOR SWITCH

1. When the oven door is closed, the contacts (COM-NC) must be opened.
2. When the oven door is opened, the contacts (COM-NC) must be closed.
3. If the oven door is opened and the contacts (COM-NO) of the 1st latch switch and 2nd latch switch fail to open, the fuse M6.3A blows simultaneously with closing the contacts (COM-NC) of the monitor switch.

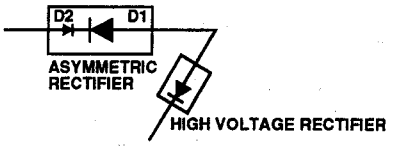
CAUTION: BEFORE REPLACING A BLOWN FUSE M6.3A TEST THE 1ST LATCH SWITCH, 2ND LATCH SWITCH MONITOR SWITCH AND MONITOR RESISTOR FOR PROPER OPERATION. (REFER TO CHAPTER "TEST PROCEDURE".)

MONITOR RESISTOR R1 0.8Ω 20W

The monitor resistor prevents the fuse M6.3A bursting when the fuse M6.3A blows due to the operation of the monitor switch.

ASYMMETRIC RECTIFIER

The asymmetric rectifier is a solid state device that prevents current flow in both directions. And it prevents the temperature rise of the power transformer by blowing the fuse M6.3A when the high voltage rectifier is shorted.



The rated peak reverse voltage of D1 of the asymmetric rectifier is 6 KV The rated peak reverse voltage of D2 of the asymmetric rectifier is 1.7 KV. D1 and D2 of the asymmetric rectifier or high voltage rectifier are shorted when the each peak reverse voltage goes beyond the each rated peak reverse voltage. (The process of blowing the fuse M6.3A).

1. The high voltage rectifier is shorted by any causes when microwave cooking or dual cooking.
2. The peak reverse voltage of D2 of the rectifier goes beyond the rated peak reverse voltage 1.7 KV in the voltage doubler circuit.
3. D2 of the rectifier is shorted.
4. The large electric currents flow through the high voltage winding of the power transformer.
5. The large electric currents beyond 6.3A flow through the primary winding of the power transformer.
6. The fuse M6.3A blows by the large electric currents.
7. The power supply to the power transformer is cut off.

FUSE M6.3A

1. The fuse M6.3A blows when the contacts (COM-NO) of the 1st latch switch and 2nd latch switch remain closed with the oven door open and when the monitor switch closes.
2. The fuse M6.3A also blows when asymmetric rectifier, H.V. rectifier, H.V. wire harness, H.V. capacitor, magnetron or secondary winding of power transformer is shorted.
3. If the wire harness or electrical components are short-circuited, the fuse M6.3A blows to prevent an electric shock of fire hazard.

TEMPERATURE FUSE 150°C (MG)

This fuse protects the magnetron against overheating. If the temperature goes up higher than 150°C because the fan motor is interrupted, the air inlet duct is blocked or the ventilation openings are obstructed, the fuse blows and cuts off the power supplying to the power transformer. The defective fuse must be replaced with new rated one.

TEMP. FUSE 150°C (OVEN)

The temp. fuse located on the top of the oven cavity is designed to prevent damage to the oven if the foods in the

oven catch fire due to over heating produced by improper setting of cook time or failure of control unit. Under normal operation, the temp. fuse remains closed. However, when abnormally high temperatures are reached within the oven cavity, the temp. fuse will open at 150°C, causing the oven to shut down. The defective fuse must be replaced with a new one.

THERMAL CUT-OUT 95°C

The thermal cut-out protect the fan motor against overheat. If its temperature goes up higher than 95°C because the fan motor is locked or the ventilation openings are blocked, the contacts of the thermal cut-out will open and switches off the oven.
When the oven cools itself down to 75°C, the contacts of the thermal cut-out will close again.

TURNTABLE MOTOR

The turntable motor drives the roller stay to rotate the turntable.

FAN MOTOR

The fan motor drives a blade which draws external cool air. This cool air is directed through the air vanes surrounding the magnetron and cools the magnetron. This air is channeled through the oven cavity to remove steam and vapours given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.

SERVICING

WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with any part of the high voltage circuit will result in electrocution. High voltage capacitor, Power transformer, Magnetron, High voltage rectifier assembly, High voltage harness.

REMEMBER TO CHECK 3D

1) Disconnect the supply.
2) Door opened, and wedged open.
3) Discharge high voltage capacitor.

WARNING: AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is, of the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-finding is carried out with the supply disconnected. It may in, some cases, be necessary to connect the supply after the outer case has been removed, in this event carry out 3D checks and then disconnect the leads to the primary of the power transformer. Ensure that these leads remain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed carry out 3D checks and reconnect the leads to the primary of the power transformer.

REMEMBER TO CHECK 4R

1) Reconnect all leads removed from components during testing.
2) Replace the outer case (cabinet).
3) Reconnect the supply.
4) Run the oven. Check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the microwave timer for two (2) minutes. Set the power level to HIGH and push the START button. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out 3D checks and re-examine the connections to the component being tested.

When all service work is completed, and the oven is fully assembled, the microwave power output should be checked and microwave leakage test carried out

TROUBLESHOOTING GUIDE

When troubleshooting the microwave oven, it is helpful to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the "Test Procedure" section.

IMPORTANT: If the oven becomes inoperative because of a blown fuse M6.3A in the 1st. latch switch - 2nd. latch switch - monitor switch - monitor resistor circuit, check the 1st. latch switch, 2nd. latch switch, monitor switch and monitor resistor before replacing the fuse M6.3A.

TEST PROCEDURE		A	B	C	CK	D	E	E	E	E	G	F	H	H	I	J	K	L	RE	CK	CK	RE	CK	CK	CK	CK	CK	F
CONDITION	POSSIBLE CAUSE AND DEFECTIVE PARTS / PROBLEM	MAGNETRON	POWER TRANSFORMER	RECTIFIER ASSEMBLY	HIGH VOLTAGE WIRE	HIGH VOLTAGE CAPACITOR	1ST. LATCH SWITCH	2ND. LATCH SWITCH	STOP SWITCH	MONITOR SWITCH	MONITOR RESISTOR	THERMAL CUT-OUT	FAN MOTOR	TURNTABLE MOTOR	FUSE M6.3A	TOUCH CONTROL PANEL	RELAYS RY-1, RY-2	FOIL PATTERN ON P.W.B.	POWER SUPPLY CORD	SHORTED WIRE HARNESS	OPENED WIRE HARNESS	OVEN LAMP AND SOCKET	WALL OUTLET	MISADJUSTMENT SWITCH	HOME FUSE OR BREAKER	BLOCKED COOLING FAN	BLOCKED VENTILATION	TEMPERATURE FUSE
OFF CONDITION	Home fuse blows when power supply cord is plugged into wall outlet.																		○	○					○			
	FUSE M6.3A blows when power supply cord is plugged into wall outlet.									○					○					○				○				
	"88:88" does not appear in display but power supply cord is plugged into wall outlet.											○			○	○		○	○		○		○		○			○
	Display does not operate properly when STOP/CLEAR pad is touched.								○							○					○			○				
	Oven lamp does not light at door opened. (Display appears.)								○							○	○			○	○	○						
COOKING CONDITION	Oven does not start when the START pad is touched. (Display appears)															○	○				○			○				
	Oven lamp does not light (Display appears.)															○	○				○	○						
	Fan motor does not operate. (Display appears.)							○					○				○				○			○		○		
	Turntable motor assembly does not operate. (Display appears.)							○						○			○				○			○				
	Oven or any electrical parts does not stop when cooking time is 0 or STOP/CLEAR pad is touched.															○	○											
	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power level is set at HIGH)	○	○	○	○	○	○									○	○				○							
	Oven does not seems to be operating properly when MEDIUM HIGH, MEDIUM, MEDIUM LOW or LOW is set. (Oven operates properly at HIGH and then the STOP/CLEAR pad is touched the oven stops.)															○	○											
	Oven goes into cook cycle but shuts down before end of cooking cycle.											○				○										○	○	○
	Oven stops as soon as when the START pad is touched.	○	○	○	○	○	○								○					○								

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

A **MAGNETRON TEST**

NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.

CARRY OUT 3D CHECK

Isolate the magnetron from high voltage circuit by removing all leads connected to filament terminal.

To test for an open circuit filament use an ohmmeter to make a continuity test between the magnetron filament terminals, the meter should show a reading of less than 1 ohm.

To test for short filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an infinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced.

MICROWAVE OUTPUT POWER (IEC-705-1988)

The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer case fitted). Microwave output power from the magnetron can be measured by way of IEC 705, i.e. it can be measured by using water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used. When P(W) heating works for t(second), approximately P x t/4.187 calorie is generated. On the other hand, if the temperature of the water with V(ml) rises ΔT (°C) during this microwave heating period, the calorie of the water is V x ΔT.

The formula is as follows;

$P \times t / 4.187 = V \times \Delta T$ $P (W) = 4.187 \times V \times \Delta T / t$

Our condition for water load is as follows:

Room temperature.....around 20°C Power supply Voltage.....Rated voltage

Water load.....1000 g Initial temperature.....10±2°C Heating time.....60 sec.

$P = 70 \times \Delta T$

Measuring condition:

1. Container
   The water container must be a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190 mm.
2. Temperature of the oven and vessel
   The oven and the empty vessel are at ambient temperature prior to the start the test.
3. Temperature of the water.
   The initial temperature of the water is (10±2)°C.
4. Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5K.
5. Select stirring devices and measuring instruments in order to minimize addition or removal of heat.
6. The graduation of the thermometer must be scaled by 0.1°C at minimum and accurate thermometer.
7. The water load must be (1000±5) g.
8. "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included.

NOTE: The operation time of the microwave oven is "t + 2" sec. 2 sec. is magnetron filament heat-up time.

Measuring method:

1. Measure the initial temperature of the water before the water is added to the vessel.
   (Example: The initial temperature T1 = 11°C)
2. Add the 1 litre water to the vessel.
3. Place the load on the centre of the shelf.
4. Operate the microwave oven at HIGH for the temperature of the water rises by a value ΔT of (10 ± 2) K.
5. Stir the water to equalize temperature throughout the vessel.

TEST PROCEDURES (CONT'D)

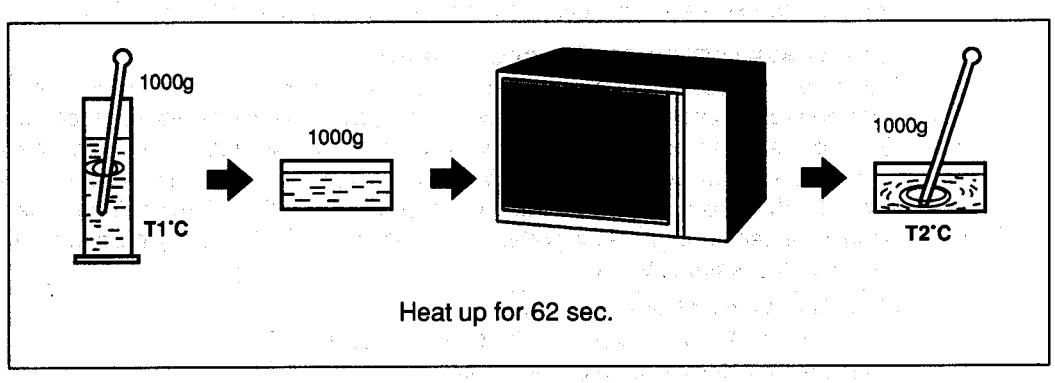
PROCEDURE LETTER	COMPONENT TEST

6. Measure the final water temperature. (Example: The final temperature T2 = 21°C)
7. Calculate the microwave power output P in watts from above formula.

Initial temperature	T1 = 11°C
Temperature after (60 + 2) = 62 sec.	T2 = 21°C
Temperature difference Cold-Warm	ΔT1 = 10°C
Measured output power	
The equation is "P = 70 x ΔT"	P = 70 x 10°C = 700 Watts

JUDGMENT: The measured output power should be at least ± 15 % of the rated output power.

CAUTION: 1°C CORRESPONDS TO 70 WATTS. REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



B **POWER TRANSFORMER TEST**

WARNING: High voltages and large currents are present at the secondary winding and filament winding transformer. It is very dangerous to work near this part when the oven is on. NEVER make any voltage measurements of the high-voltage circuits, including the magnetron filament.

CARRY OUT 3D CHECKS

Disconnect the leads to the primary winding of the power transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three windings. The following readings should be obtained:-

a. Primary winding	1.34 ohms approximately
b. Secondary winding	96.9 ohms approximately
c. Filament winding	less than 1 ohm

If the reading obtained are not stated above, then the power transformer is probably faulty and should be replaced.

CARRY OUT 4R CHECKS

C **HIGH VOLTAGE RECTIFIER ASSEMBLY TEST**

HIGH VOLTAGE RECTIFIER TEST

CARRY OUT 3D CHECKS.

Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal B+C of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is infinite in one direction and more than 100 kΩ in the other direction.

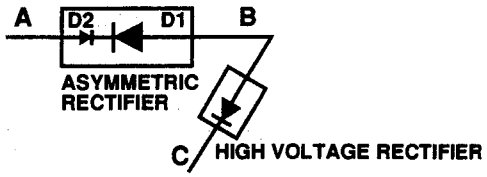
TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

CARRY OUT 4R CHECKS

ASYMMETRIC RECTIFIER TEST

CARRY OUT 3D CHECKS.



Isolate the high voltage rectifier assembly from the HV circuit. The asymmetric can be tested using an ohmmeter set to its highest range across the terminals A+B of the asymmetric rectifier and note the reading obtained. Reverse the meter leads and note this second reading. If an open circuit is indicated in both direction then the asymmetric rectifier is good. If an asymmetric rectifier is shorted in either direction, then the asymmetric rectifier is probably faulty and must be replaced with high voltage rectifier. When the asymmetric rectifier is defective, check whether magnetron, high voltage rectifier, high voltage wire or filament winding of the power transformer is shorted.

CARRY OUT 4R CHECKS

NOTE: FOR MEASUREMENT OF THE RESISTANCE OF THE RECTIFIER, THE BATTERIES OF THE MEASURING INSTRUMENT MUST HAVE A VOLTAGE AT LEAST 6 VOLTS, BECAUSE OTHERWISE AN INFINITE RESISTANCE MIGHT BE SHOWN IN BOTH DIRECTIONS.

D **HIGH VOLTAGE CAPACITOR TEST**

CARRY OUT 3D CHECKS

A. Isolate the high voltage capacitor from the circuit.
B. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
C. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10MΩ after it has been charged.
D. A short-circuited capacitor shows continuity all the time.
E. An open capacitor constantly shows a resistance about 10 MΩ because of its internal 10MΩ resistance.
F. When the internal wire is opened in the high voltage capacitor shows an infinite resistance.
G. The resistance across all the terminals and the chassis must be infinite when the capacitor is normal.

If incorrect reading are obtained, the high voltage capacitor must be replaced.

E **SWITCH TEST**

CARRY OUT 3D CHECKS

Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

Table: Terminal Connection of Switch

Plunger Operation	COM to NO	COM to NC
Released	O.C.	S.C.
Depressed	S.C.	O.C.

COM; Common terminal, NO; Normally open terminal NC; Normally close terminal
S.C.; Short, O.C.; Open circuit

If incorrect readings are obtained, make the necessary switch or replace the switch.

CARRY OUT 4R CHECKS.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

F **TEMPERATURE FUSE OR THERMAL CUT-OUT TEST**

CARRY OUT 3D CHECKS

Disconnect the leads from the terminals of the thermal cut-out. Then using an ohmmeter, make a continuity test across the two terminals as described in the below.

Table: Temperature Fuse or Thermal Cut-out Test

Parts Name	Temperature of "ON" condition (closed circuit). (°C)	Temperature of "OFF" condition (open circuit). (°C)	Indication of ohmmeter (When room temperature is approx. 20°C.)
Temp. fuse 150°C	This is not resetable type.	Above 150°C	Closed circuit
Thermal cut-out 95°C	Below 75°C	Above 95°C	Closed circuit.

If incorrect readings are obtained, replace the temp. fuse or thermal cut-out.
An open circuit temperature fuse (MG) indicates that the magnetron has overheated, this may be due to resistricted ventilation, cooling fan failure.
An open circuit temperature fuse (OVEN) indicates that the oven cavity has overheated, this may be due to no load operation.
An open circuit thermal cut-out 95°C indicates that the fan motor winding has overheated, this may be due to resisted ventilation
or locked cooling fan.

G **MONITOR RESISTOR TEST**

CARRY OUT 3D CHECKS.

Disconnect the leads from the monitor resist. Using an ohmmeter and set on a low range. Check between the terminals of the monitor resistor.

The resistance of monitor resistor is approx. 0.8 ohms.

If incorrect readings are obtained, replace the monitor resistor.

CARRY OUT 4R CHECKS.

H **MOTOR WINDING TEST**

CARRY OUT 3D CHECKS

Disconnect the leads from the motor.
Using an ohmmeter, check the resistance between the two terminals as described in the table below.

Table: Resistance of Motor

Motors	Resistance
Fan motor	Approximately 330 ohms
Turntable motor	Approximately 12 kohms

If incorrect readings are obtained, replace the motor.

CARRY OUT 4R CHECKS

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST
I	**BLOWN FUSE M6.3A** CARRY OUT 3D CHECKS If the fuse M6.3A is blown when the door is opened, check the 1st latch switch, 2nd latch switch, monitor switch and monitor resistor. If the fuse M6.3A is blown by incorrect door switching replace the defective switch(es) and the fuse M6.3A. If the fuse M6.3A is blown, there is a short in the asymmetric rectifier or there is a ground in wire harness. A short in the asymmetric rectifier may be occurred due to short or ground in H.V. rectifier, magnetron, power transformer or H.V. wire. Check them and replace the defective parts or repair the wire harness. If the fuse M6.3A is blown, there is a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness. CARRY OUT 4R CHECKS **CAUTION: Only replace fuse with the correct value replacement.**
J	**TOUCH CONTROL PANEL ASSEMBLY TEST** The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance cannot be performed with only a voltmeter and ohmmeter. In this service manual, the touch control panel assembly is divided into two units, Control Unit and Key Unit, and troubleshooting by replacement is described according to the symptoms indicated. 1. Key Unit. Note : Check key unit ribbon connection before replacement. The following symptoms indicate a defective key unit. Replace the key unit. a) When touching the pads, a certain pad produces no signal at all. b) When touching a number pad, two figures or more are displayed. c) When touching the pads, sometimes a pad produces no signal. 2. Control Panel The following symptoms indicate a defective control unit. Replacing the control unit perform the key unit test (Procedure L) to determine if control unit is faulty. 2-1 In connection with pads. a) When touching the pads, a certain group of pads do not produce a signal. b) When touching the pads, no pads produce a signal. 2-2 In connection with indicators a) At a certain digit, all or some segments do not light up. b) At a certain digit, brightness is low. c) Only one indicator does not light. d) The corresponding segments of all digits do not light up; or they continue to light up. e) Wrong figure appears. f) A certain group of indicators do not light up. g) The figure of all digits flicker. 2-3 Other possible problems caused by defective control unit. a) Buzzer does not sound or continues to sound. b) Clock does not operate properly. c) Cooking is not possible.
K	**RELAY TEST** CARRY OUT 3D CHECKS Remove the outer case and check voltage between Pin Nos. 3 and 5 of the 3 pin connector (A) on the control unit with an A.C. voltmeter. The meter should indicate 220-230 volts, if not check oven circuit. RY1 and RY2 Relay Test Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation. DC. voltage indicated.....Defective relay. DC. voltage not indicated.....Check diode which is connected to the relay coil. If diode is good, control unit is defective.

TEST PROCEDURES (CONT'D)

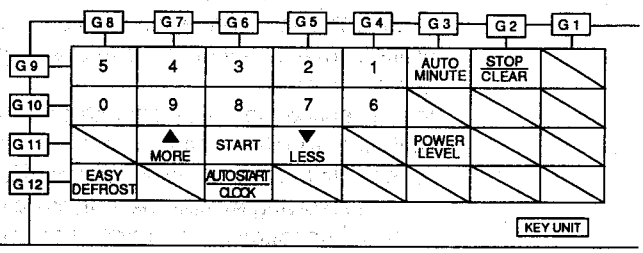
PROCEDURE LETTER — **COMPONENT TEST**

RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS
RY1	Approx. 26.0 V.D.C.	Oven lamp/Turntable motor/Cooling fan motor
RY2	Approx. 25.0 V.D.C.	Power transformer

CARRY OUT 4D CHECKS

L **KEY UNIT TEST**

If the display fails to clear when the STOP/CLEAR pad is depressed, first verify the flat ribbon is making good contact, verify that the door sensing switch (stop switch) operates properly; that is the contacts are closed when the door is closed and open when the door is open. If the door sensing switch (stop switch) is good, disconnect the flat ribbon cable that connects the key unit to the control unit and make sure the door sensing switch is closed (either close the door or short the door sensing switch connecter). Use the Key unit matrix indicated on the control panel schematic and place a jumper wire between the pins that correspond to the STOP/CLEAR pad making momentary contact. If the control unit responds by clearing with a beep the key unit is faulty and must be replaced. If the control unit does not respond, it is a faulty and must be replaced. If a specific pad does not respond, the above method may be used (after clearing the control unit) to determine if the control unit or key pad is at fault.



M **PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD(PWB) IS OPEN.**

To protect the electronic circuits, this model is provided with a fine foil pattern added to the primary on the PWB, this foil pattern acts as a fuse. If the foil pattern is open, follow the troubleshooting guide given below for repair.

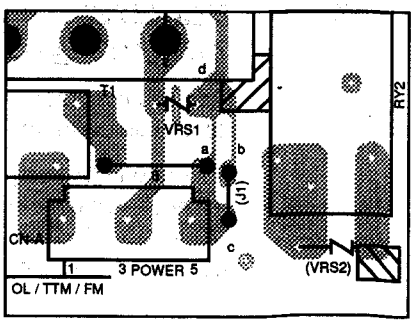
Problem: POWER ON, indicator does not light up.

STEPS	OCCURANCE	CAUSE OR CORRECTION
1	The rated AC voltage is not present at POWER terminal of CPU connector (CN-A)	Check supply voltage and oven power cord.
2	The rated AC voltage is present at primary side of low voltage transformer.	Low voltage transformer or secondary circuit defective. Check and repair.
3	Only pattern at "a" is broken.	*Insert jumper wire J1 and solder. (CARRY OUT 3D CHECKS BEFORE REPAIR)
4	Pattern at "a" and "b" are broken.	*Insert the coil RCILF2003YAZZ between "c" and "d". (CARRY OUT 3D CHECKS BEFORE REPAIR)

CARRY OUT 3D CHECKS

NOTE: At the time of these repairs, make a visual inspection of the varistor for burning damage and examine the transformer with tester for the presence of layer short-circuit (check primary coil resistance). If any abnormal condition is detected, replace the defective parts.

CARRY OUT 4R CHECKS



TOUCH CONTROL PANEL ASSEMBLY

OUTLINE OF TOUCH CONTROL PANEL

The touch control section consists of the following units as shown in the touch control panel circuit.

(1) Key Unit
(2) Control Unit

The principal functions of these units and the signals communicated among them are explained below.

Key Unit
The key unit is composed of a matrix, signals generated in the LSI are sent to the key unit through R10-R13, R20, R21 and R22. When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through R00-R03 to perform the function that was requested.

Control Unit
Control unit consists of LSI, power source circuit, synchronizing signal circuit, ACL circuit, buzzer circuit and indicator circuit.

1) LSI
This LSI controls the key strobe signal, relay driving signal for oven function and indicator signal.

2) Power Source Circuit
This circuit generates voltages necessary in the control unit.

Symbol	Voltage	Application
VC	-5V	LSI(IC1)
VP	-26V	Fluorescent display tube : Grid and anode voltage
VF1	2.2Vac	Filament of fluorescent display tube
VF2		(VF1 to VF2 voltage)

3) Synchronizing Signal Circuit
The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit. It accompanies a very small error because it works on commercial frequency.

4) ACL Circuit
A circuit to generate a signals which resets the LSI to the initial state when power is supplied.

5) Buzzer Circuit
The buzzer is responsive to signals from the LSI to emit noticing sounds (key touch sound and completionsound).

6) Door Sensing Switch (Stop Switch)
A switch to "tell" the LSI if the door is open or closed.

7) Relay Circuit
To drive the magnetron, fan motor, turntable motor and light the oven lamp.

8) Indicator Circuit
Indicator element is a Fluorescent Display.
Basically, a Fluorescent Display is triode having a cathode, a grid and an anode. Usually, the cathode of a Fluorescent Display is directly heated and the filament serves as cathode.
The Fluorescent Display has 6-digits, 13-segments are used for displaying figures.

DESCRIPTION OF LSI

LSI(IZA505DR)

The I/O signal of the LSI(IZA505DR) is detailed in the following table.

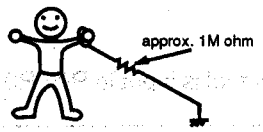
Pin No.	Signal	I/O	Description
1	Vdisp	IN	**Anode (segment) of Fluorescent Display illumination voltage: -26V** Vp voltage of power source circuit input.
2	R00	IN	**Signal coming from touch key.** When either one of G12 line keys on key matrix is touched, a corresponding signal will be input into R00.
3	R01	IN	**Signal coming from touch key.** When either one of G11 line keys on key matrix is touched, a corresponding signal will be input into R01.
4	R02	IN	**Signal coming from touch key.** When either one of G10 line keys on key matrix is touched, a corresponding signal will be input into R02.
5	R03	IN	**Signal coming from touch key.** When either one of G9 line keys on key matrix is touched, a corresponding signal out of R20-R22, R10-R13 will be input into R03. When no key is touched, the signal is held at "L" level.
6	TEST	IN	Connected to VC.
7	RESET	IN	**Auto clear terminal.** Signal is input to reset the LSI to the initial state when power is supplied. Temporarily set to "L" level the moment power is supplied, at this time the LSI is set. Thereafter set at "H" level.
8	OSC1	IN	**Internal clock oscillation frequency input setting.** The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to OSC1 terminal.
9	OSC2	OUT	**Internal clock oscillation frequency control output.** Output to control oscillation input of OSC2.
10/11	GND/AVSS	IN/IN	Connected to VC.
12	AN0	OUT	**Oven lamp,turntable motor and cooling fan motor driving signal. (Square Waveform : 50Hz)** To turn on and off the control relay. The pulse signal (50Hz) is delivered to the control relay driving circuit and cook relay control circuit.
13	AN1	OUT	Terminal not used.
14	AN2	OUT	**Magnetron high-voltage circuit driving signal.** To turn on and off the cook relay. In Low operation, the signals holds "L" level during microwave cooking and "H" level while not cooking. In other cooking modes (MED HIGH, MED,MED LOW,LOW) the signal turns to "L" level and "H" level in repetition according to the power level.
15	AN3	OUT	Terminal not used.
16	AN4	IN	**Input signal which communicates the door open/close information to LSI.** Door closed; "H" level signal. Door opened; "L" level signal.
17-19	AN5-AN7	IN	Connected to VC.
20/21	AVCC/VCC	IN/IN	Connected to GND.
22	INT0	IN	**Signal synchronized with commercial source freqency(50Hz).** This is basic timing for time processing of LSI.
23	D1	OUT	Terminal not used.
24	D2	OUT	**Digit selection signal.** Refer to the touch control panel circuit about the relation between signals and digits. Normally, one pulse is output in every synchronized signal period, and input to the grid of the fluorescent display.

Pin No.	Signal	I/O	Description
25	BUZZ	OUT	**Signal to sound buzzer.** A: key touch sound(0.12sec.). B: Completion sound(2.4sec.).
26-29	D4-D7	OUT	**Digit selection signal.** Refer to the touch control panel circuit about the relation between signals and digits. Normally, one pulse is output in every synchronized signal period, and input to the grid of the fluorescent display.
30	D8	OUT	**Segment data signal.** Refer to the touch control panel circuit for the relationship between signals and indicators. Normally, one pulse is output in every synchronized signal period, and input to the anode of the fluorescent display.
31-34	$R8_0$-$R8_3$	OUT	**Segment data signal.** Refer to the touch control panel circuit for the relationship between signals and indicators. Normally, one pulse is output in every synchronized signal period, and input to the anode of the fluorescent display.
35	$R1_0$	OUT	**Segment data signal.** Signal similar to D8. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to $R0_0$-$R0_3$ terminal while one of G8 line keys on key matrix is touched.
36	$R1_1$	OUT	**Segment data signal.** Signal similar to D8. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to $R0_0$-$R0_3$ terminal while one of G7 line keys on key matrix is touched.
37	$R1_2$	OUT	**Segment data signal.** Signal similar to D8. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to $R0_0$-$R0_3$ terminal while one of G6 line keys on key matrix is touched.
38	$R1_3$	OUT	**Segment data signal.** Signal similar to D8. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to $R0_0$-$R0_3$ terminal while one of G5 line keys on key matrix is touched.
39	$R2_0$	OUT	**Segment data signal.** Signal similar to D8. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to $R0_0$-$R0_3$ terminal while one of G4 line keys on key matrix is touched.
40	$R2_1$	OUT	**Segment data signal.** Signal similar to D8. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to $R0_0$-$R0_3$ terminal while one of G3 line keys on key matrix is touched.
41	$R2_2$	OUT	**Segment data signal.** Signal similar to D8. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to $R0_0$-$R0_3$ terminal while one of G2 line keys on key matrix is touched.
42	$R2_3$	OUT	**Segment data signal.** Signal similar to D8.

SERVICING

1. **Precautions for Handling Electronic Components**
This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charge in clothes, etc, and sometimes it is not fully protected by the built-in protection circuit.
In order to protect CMOS LSI.

1) When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap all PW boards containing them in aluminium foil.
2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. **Shapes of Electronic Components**

Transistor
DTA114ES
DTB143ES
DTD143ES
2SA933S

3. **Servicing of Touch Control Panel**
We describe the procedures to permit servicing of the touch control panel of the microwave oven and the precautions you must take when doing so. To perform the servicing, power to the touch control panel is available either from the power line of the oven itself or from an external power source.

(1) Servicing the touch control panel with power supply of the oven:

CAUTION:
THE HIGH VOLTAGE TRANSFORMER OF THE MICRO-WAVE OVEN IS STILL LIVE DURING SERVICING PRESENTS A HAZARD.

Therefore, when checking the performance of the touch control panel, put the outer cabinet on the oven to avoid touching the high voltage transformer, or unplug the primary terminal (connector) of the high voltage transformer to turn it off; the end of such connector must be insulated with an insulating tape. After servicing, be sure to replace the leads to their original locations.

A. On some models, the power supply cord between the touch control panel and the oven itself is so short that the two can't be separated. For those models, check and repair all the controls (sensor-related ones included) of the touch control panel while keeping it connected to the oven.

B. On some models, the power supply cord between the touch control panel and the oven proper is long enough that they may be separated from each other. For those models, therefore, it is possible to check and repair the controls of the touch control panel while keeping it apart from the oven proper; in this case you must short both ends of the door sensing switch (on PWB) of the touch control panel with a jumper, which brings about an operational state that is equivalent to the oven door being closed. As for the sensor-related controls of the touch control panel, checking them is possible if dummy resistor(s) with resistance equal to that of the controls are used.

(2) Servicing the touch control panel with power supply from an external power source:

Disconnect the touch control panel completely from the oven proper, and short both ends of the door sensing switch (on PWB) of the touch control panel which brings about an operational state that is equivalent to the oven door being closed. Connect an external power source to the power input terminal of the touch control panel, then it is possible to check and repair the controls of the touch control panel it is also possible to check the sensor-related controls of the touch control panel by using the dummy resistor(s).

4. **Servicing Tools**
Tools required to service the touch control panel assembly.

1) Soldering iron: 30W
(It is recommended to use a soldering iron with a grounding terminal.)
2) Oscilloscope: Single beam, frequency range: DC-10MHz type or more advanced model.
3) Others: Hand tools

5. **Other Precautions**

1) Before turning on the power source of the control unit, remove the aluminium foil applied for preventing static electricity.
2) Connect the connector of the key unit to the control unit being sure that the lead wires are not twisted.
3) After aluminium foil is removed, be careful that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
4) Attach connectors, electrolytic capacitors, etc. to PWB, making sure that all connections are tight.
5) Be sure to use specified components where high precision is required.

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

WARNING: Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.

1. CARRY OUT 3D CHECKS.
2. Make sure that a definite" click" can be heard when the microwave oven door is unlatched. (Hold the door in a closed position with one hand, then push the door open button with the other, this causes the latch leads to rise, it is then possible to hear a "click' as the door switches operate.)
3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.
Do not operate the oven if any of the following conditions exist;

1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal or damaged.
4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

Do not operate the oven:
1. Without the RF gasket (Magnetron).
2. If the wave guide or oven cavity are not intact.
3. If the door is not closed.
4. If the outer case (cabinet) is not fitted.

Please refer to 'OVEN PARTS, CABINET PARTS, DOOR PARTS', when carrying out any of the following removal procedures:

OUTER CASE REMOVAL

To remove the outer case proceed as follows.
1. Disconnect oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the screws from rear and along the side edge of case.
4. Slide the entire case back about 3cm to free it from retaining clips on the cavity face plate.
5. Lift the entire case from the oven.
6. Discharge the H.V. capacitor before carrying out any further work.
7. Do not operate the oven with the outer case removed.

N.B.; Step 1, 2 and 6 form the basis of the 3D checks.

CAUTION: DISCHARGE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENT OR WIRING.

HIGH VOLTAGE COMPONENTS REMOVAL (HIGH VOLTAGE CAPACITOR AND HIGH VOLTAGE RECTIFIER ASSEMBLY)

To remove the components, proceed as follows.
1. CARRY OUT 3D CHECKS
2. Lift up the HVC cover.
3. Disconnect the H.V. wire of the H.V. rectifier assembly from the power transformer.
4. Disconnect the filament lead of the power transformer from the H.V. capacitor.
5. Remove one (1) screw holding capacitor holder to rear cabinet.
6. Remove one (1) screw holding earth side terminal of high voltage rectifier assembly, and remove capacitor holder.
7. Disconnect all the leads and terminals of high voltage rectifier assembly from high voltage capacitor.
8. Disconnect the H.V. wire A from the H.V. rectifier assembly.

CAUTION: WHEN REPLACING HIGH VOLTAGE RECTIFIER ASSEMBLY, ENSURE THAT THE CATHODE (EARTH) CONNECTION IS SECURELY FIXED TO THE CAPACITOR HOLDER WITH AN EARTHING SCREW.

CAUTION: DO NOT REPLACE ONLY HIGH VOLTAGE RECTIFIER. WHEN REPLACING IT, REPLACE HIGH VOLTAGE RECTIFIER ASSEMBLY.

9. Now H.V. rectifier assembly and H.V. copacitor should be free.

POWER TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS
2. Disconnect the wire leads main wire harness and H.V. wire from power transformer.
3. Release the lead of the power transformer from the wire holder.
4. Disconnect the lead from magnetron filament.
5. Disconnect the lead of the power transformer from high voltage capacitor.
6. Remove the four (4) screws holding the transformer to bottom plate.
7. Remove the transformer.

CONTROL PANEL REMOVAL

1. CARRY OUT 3D CHECKS
2. Disconnect the leads from the control panel assembly.
3. Remove the one (1) screw holding the control panel to the front plate of the oven cavity.
4. Lift up the control panel and release if from the oven cavity.
5. Now, the control panel assembly is free.

MAGNETRON REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from magnetron.
3. Remove the four (4) screws holding the magnetron to the waveguide.
4. Remove the magnetron from waveguide.
5. Now, the magnetron is free.

CAUTION: WHEN REPLACING THE MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND THE MAGNETRON MOUNTING SCREWS ARE TIGHTENED SECURELY.

FAN MOTOR REPLACEMENT

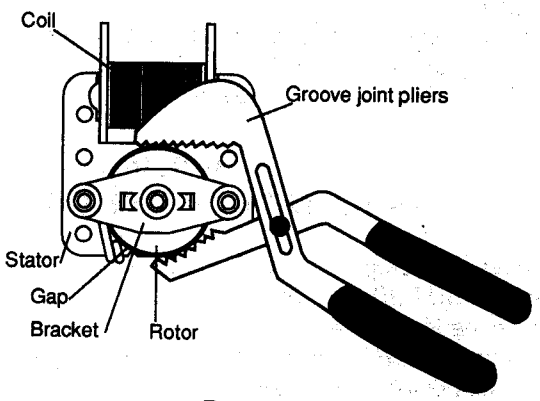
REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the fan motor and thermal cut-out.
3. Tear the wire holder B holding the filament lead of the power transformer and the H.V. wire A.
4. Remove the one (1) screw holding the chassis support to the oven cavity front plate.
5. Push the tab at the end of the chassis support caught on the rear cabinet of the oven cavity.
6. Remove the chassis support by pulling it.
7. Remove the magnetron referring to "MAGNETRON REMOVAL".
8. Remove the one (1) screw holding the air guide to the oven cavity and remove the air guide.
9. Release the snap band of the main wire harness from the light mount plate.
10. Release the filament lead of the power transformer and the H.V. wire A from the fan duct.
11. Release the fan motor assembly from the oven cavity.
12. Remove the one (1) screw from the thermal cut-out angle.
13. Remove the fan blade from the fan motor shaft according the following procedure.
    1) Hold the edge of the rotor of the fan motor by using a pair of groove joint pliers.

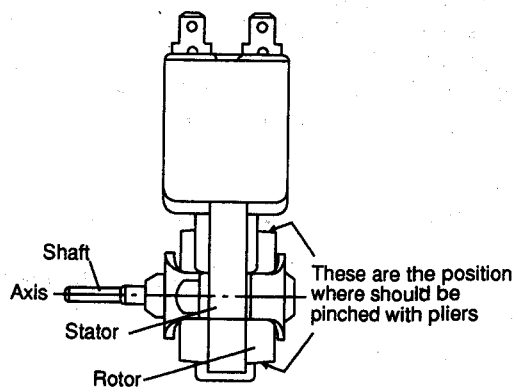
    CAUTION:
    - **Make sure that any pieces do not enter the gap between the rotor and the stator of the fan motor. Because the rotor is easy to be shaven by pliers and metal pieces may be produced.**
    - **Do not touch the pliers to the coil of the fan motor because the coil may be cut or injured.**
    - **Do not transform the bracket by touching with the pliers.**

    2) Remove the fan blade assembly from the shaft of the fan motor by pulling and rotating the fan blade with your hand.
    3) Now, the fan blade will be free.

    CAUTION:
    - **Do not use this removed fan blade again. Because the hole (for shaft) of it may become bigger than a standard one.**
14. Remove the two (2) screws holding the fan motor to the fan duct.
15. Now, the fan motor is free.



Rear view

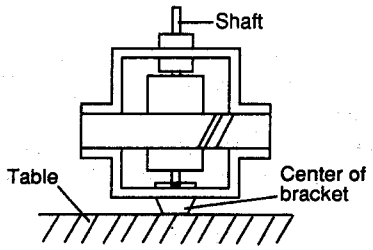


Side view

INSTALLATION

1. Install the fan motor to the fan motor angle with the two (2) screws.
2. Install the fan blade to the fan motor shaft according the following procedure.
   1) Hold the centre of the bracket which supports the shaft of the fan motor on the flat table.
   2) Apply the screw lock tight into the hole (for shaft) of the fan blade.
   3) Install the fan blade to the shaft of fan motor by pushing the fan blade with a small, light weight, ball peen hammer or rubber mallet.

   CAUTION:
   - **Do not hit the fan blade strongly when installed because the bracket may be transformed.**
   - **Make sure that the fan blade rotates smooth after installed.**
   - **Make sure that the axis of the shaft is not slanted.**
3. Install the thermal cut-out angle to the fan motor with the one (1) screw.
4. Install the fan motor assembly to the oven cavity by inserting the tabs of the fan duct into the holes of the oven cavity.
5. Re-install the air guide to the oven cavity with the one (1) screw.
6. Re-install the magnetron, together with the fan duct, to the waveguide of the oven cavity with the four (4) screws.
7. Insert the end of the chassis support into the slit of the oven cavity rear cabinet.
8. Re-install the chassis support to the oven cavity front plate with the one (1) screw.
9. Install the main wire harness into the hole of the fan duct and insert the snap band of the main wire harness into the hole of the light mount plate.
10. Install the filament lead and the H.V. wire A into the hole of the fan duct and tie them with the wire holder B.
11. Connect the filament lead and the H.V. wire to the magnetron, referring to the pictorial diagram.
12. Connect the wire leads to the fan motor and the thermal cut-out, referring to the pictorial diagram.



OVEN LAMP SOCKET REMOVAL

1. CARRY OUT 3D CHECKS
2. Pull the wire leads from the oven lamp socket by pushing the terminal hole of the oven lamp socket with the flat type small screw driver.
3. Tear the cushion from the light mount plate.
4. Bend the tab of the light mount plate holding the oven.
5. Lift up the oven lamp socket.
6. Now, the oven lamp socket is free.

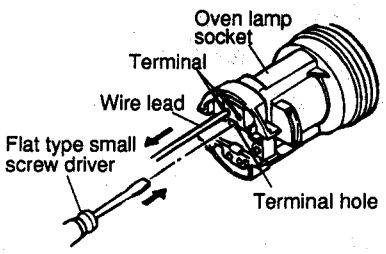


Figure C-1. Oven lamp socket

POSITIVE LOCK® CONNECTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Pushing the lever of positive lock® connector.
3. Pull out the positive lock® connector.

CAUTION:
When you (Service engineers) connect the positive lock® connectors to the terminals, connect the positive lock® so that the lever face you (Service engineers).

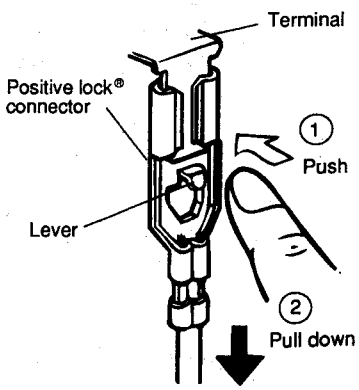


Figure C-2 Positive lock® connector

TURNTABLE MOTOR REPLACEMENT

Removal

1. Disconnect the oven from the power supply.
2. Remove the turntable and roller stay from the oven cavity.
3. Turn the oven over.
4. Cut the four (4) bridges holding the turntable motor cover to the bottom plate L with the cutting pliers as shown in Figure C-3 (a).

CAUTION: DO NOT DROP THE TURNTABLE MOTOR COVER INTO THE OVEN AFTER CUTTING THE BRIDGES. BECAUSE IT WILL DAMAGE THE WIRE LEADS OF THE MOTOR AND IT IS DIFFICULT TO REMOVE IT OUT OF THE OVEN.

5. Remove the turntable motor cover from the bottom plate L.
6. Disconnect the wire leads from the turntable motor.
7. Remove the single (1) screw holding the turntable motor to the oven cavity.
8. Remove the turntable motor from the oven cavity.
9. Remove the O-ring and washer from the turntable motor.
10. Now, the turntable motor is free.

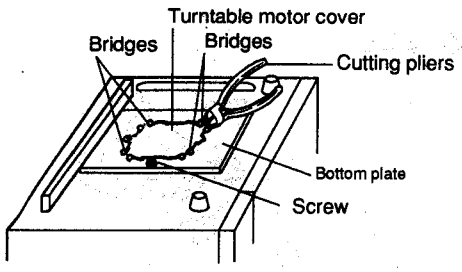


Figure C-3(a). Turntable Motor Cover Removal

Re-install

1. Remove the any sharp edges on the turntable motor cover and the bottom plate L with the cutting pliers.
2. Remove the single (1) screw on the bottom plate as shown in Figure C-3 (a).
3. Re-install the O-ring.
4. Apply the grease (Shinetsu silicone grease G-420 of Sinetsu Chemical Co. Ltd. or Toray Silicone grease SH-14 of Toray Silicone Co., Ltd.) to the O-ring and the roots of the turntable motor shaft as shown in Figure C-4.
5. Re-install the turntable motor with the O-ring and washer to the oven cavity with the single (1) screw.
6. Re-connect the wire leads to the turntable motor.
7. Insert the tab of the turntable motor cover into the hole of the bottom plate as shown in Figure C-3(b).
8. Re-install the turntable motor cover to the bottom plate L with the screw and washer which are removed at the above step 2 as shown in Figure C-3(b).

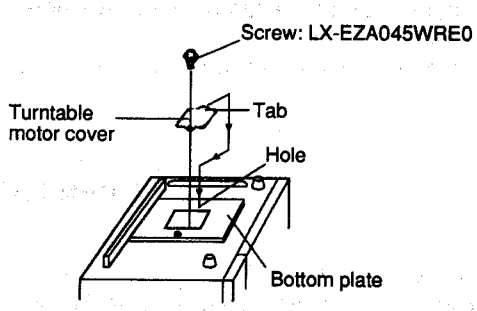


Figure C-3(b). Turntable Motor Cover Re-install

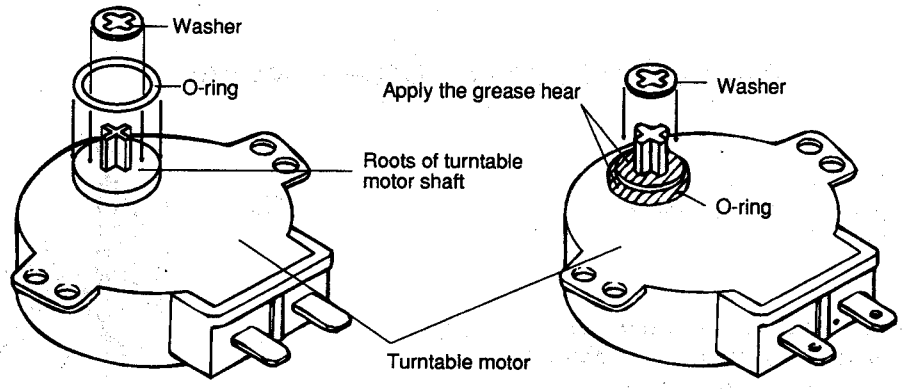


Figure C-4. Washer and O-ring Installation and Grease Applying.

POWER SUPPLY CORD REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Disconnect the brown wire of the power supply cord from the fuse holder.
3. Remove the connector CE-230 by cutting the connected wire leads to it.
4. Remove the single (1) screw holding the green/yellow wire of the power supply cord to the oven cavity.
5. Remove the power supply cord from the oven.

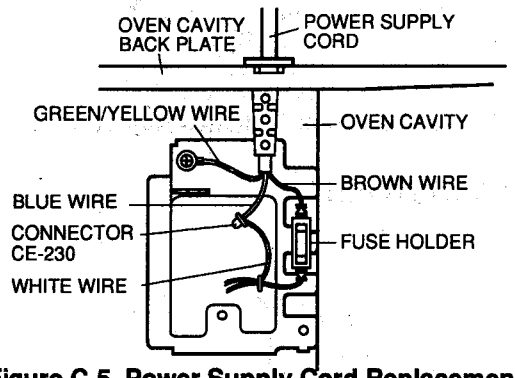
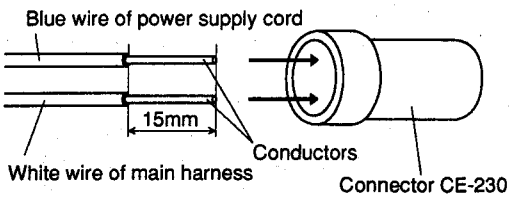


Figure C-5. Power Supply Cord Replacement

Re-install

1. Connect the brown wire of the power supply cord to the fuse holder.
2. Install the green/yellow wire of the power supply cord to the oven cavity with the single (1) screw tightly.



3. Make sure that the blue wire and the white wire are stripped for 15mm length.
4. Wind the conductors of Blue and White wires each other.
5. Insert the stripped wire leads into the connector CE-230.
6. Clamp the connector CE-230 with the correct tool tightly.

1ST., 2ND. LATCH SWITCH, STOP SWITCH AND MONITOR SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the control panel assembly referring to "CONTROL PANEL REPLACEMENT".
3. Remove the switch lever from the oven cavity front plate by making the tab of the oven cavity front plate flat.
4. Disconnect the leads from all switches.
5. Remove the two (2) screws holding the latch hook to the oven cavity.
6. Remove the latch hook.
7. Remove the switches are from the latch hook by pushing the retaining tab backwards slightly and turning the switches are on the post. Now, the switches are free.

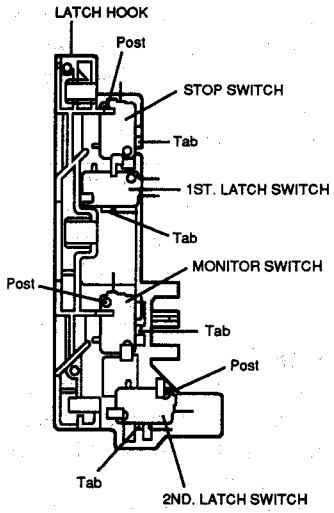


Figure C-6. Switches

1ST., 2ND. LATCH SWITCH, STOP SWITCH AND MONITOR SWITCH ADJUSTMENT

If the 1st latch switch, 2nd latch switch, stop switch and monitor switch do not operate properly due to a mis-adjustment, the following adjustment should be made.

1. CARRY OUT 3D CHECKS
2. Loosen the two (2) screws holding the latch hook to the oven cavity front flange.
3. With door closed, adjust the latch hook by moving it back and forward. In and out play of the door allowed by the latch hook should be less than 0.5 mm. The horizontal position of the latch hook should be placed where the monitor switch and stop switch have activated with the door closed. The vertical position of the latch hook should be placed where the 1st and 2nd latch switches have activated with the door closed.
4. Secure the screws with washers firmly.
5. Make sure of the 1st latch switch, 2nd latch switch, stop switch and monitor switch operation. If those switches have not activated with the door closed, two (2) screws holding latch hook to oven cavity front flange and adjust the latch hook position.

After adjustment, make sure of following:

1. In and out play of door remains less than 0.5 mm when latched position. First check latch hook position, pushing and pulling the door toward the oven face. The results (play of the door) should be less than 0.5mm.
2. The contacts (COM-NO) of the 1st and 2nd latch switches open before the door can be opened. The contacts (COM -NC) of the 1st latch switch close before the door can be opened.
3. The monitor switch contacts close when the door is opened.
4. The stop switch contacts open when the door is opened.
5. Re-install outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

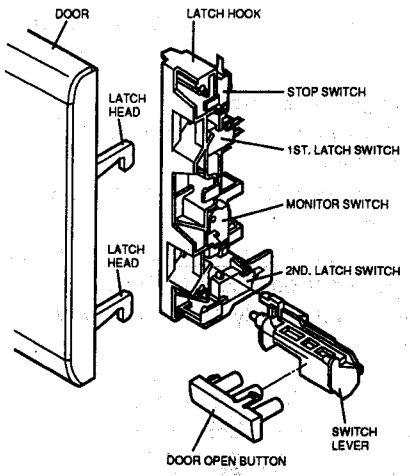


Figure C-7. Latch Switches Adjustment

DOOR REPLACEMENT AND ADJUSTMENT

DOOR REPLACEMENT

1. CARRY OUT 3D CHECKS
2. Remove two (2) screws holding the lower oven hinge to the bottom plate L. The lower oven hinge is now free.
3. Open the door by pushing the door open button.
4. Remove door assembly from the upper oven hinge by pulling it forward.
5. Re-install the door assembly to the upper oven hinge.
6. On re-installing new door assembly, secure the lower oven hinge with the two (2) mounting screws to the oven cavity. Make sure the door is parallel with bottom line of the oven face plate and the latch heads pass through the latch holes correctly.
7. CARRY OUT 4R CHECKS

Note:	After any service to the door, an approved microwave survey meter should be used to assure compliance with proper microwave radiation standards. (Refer to Microwave Measurement Procedure.)

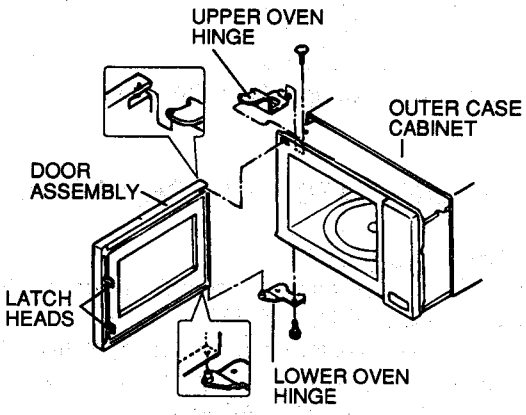


Figure C-8. Door Assembly Replacement and Adjustment

DOOR ADJUSTMENT

When removing and/or loosening hinges such as in door replacement, the following adjustment criteria are taken. Door is adjusted to meet the following three conditions by keeping screws of hinge loose.

1. Adjust door latch heads at a position where they smoothly catch the latch hook through the latch holes. Refer to latch switch adjustments.
2. Deviation of the door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. The door is positioned with its face depressed toward the cavity face plate.
4. Reinstall outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

CHOKE COVER REMOVAL

1. Insert an iron plate (thickness of about 0.5mm) or flat type screw driver to the gap between the choke cover and door panel as shown figure to free the engaging part.
2. Lift up the choke cover, now cover is free.

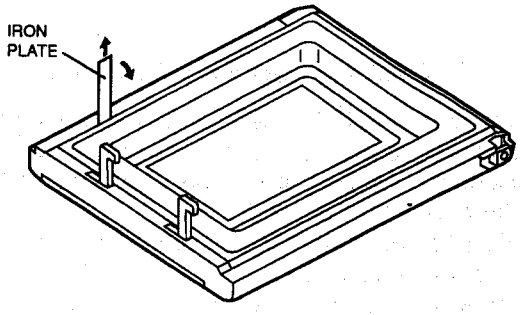


Figure C-9. Choke Cover Removal

DOOR PARTS REMOVAL

Remove the door assembly, referring to from item 1 through item 4 of "DOOR REPLACEMENT".

1. Place the door assembly on a soft cloth with facing up.
2. Remove the choke cover, referring to "CHOKE COVER REMOVAL".

DOOR FRAME AND LATCH HEAD REMOVAL

3. Remove the door screen from the door frame.
4. Remove the four (4) screws holding the door panel to the door frame.
5. Remove the door frame from the door panel. Now the door frame is free.
6. Release the latch spring from the tabs of the latch head.
7. Release the latch head from the door panel.
8. Now, the latch head is free.

SEALER FILM

Removal

1. Tear the sealer film from the door panel.
2. Now, the sealer film is free.

Installation

1. Put the adhesive tape on the backing film of the sealer film as shown in Fig. 10.
2. Tear the backing film by pulling the adhesive tape.
3. Put the pasted side of the sealer film on the door panel.

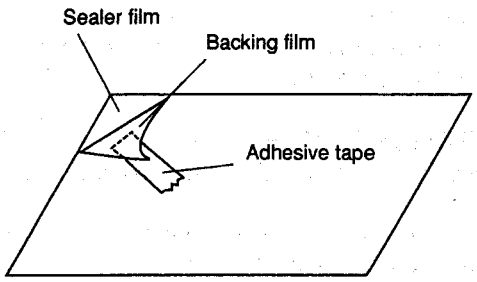


Figure C-10. Sealer film

MICROWAVE MEASUREMENT

After adjustment of door latch switches, monitor switch and door are completed individually or collectively, the following leakage test must be performed with a survey instrument and it must be confirmed that the result meets the requirements of the performance standard for microwave oven.

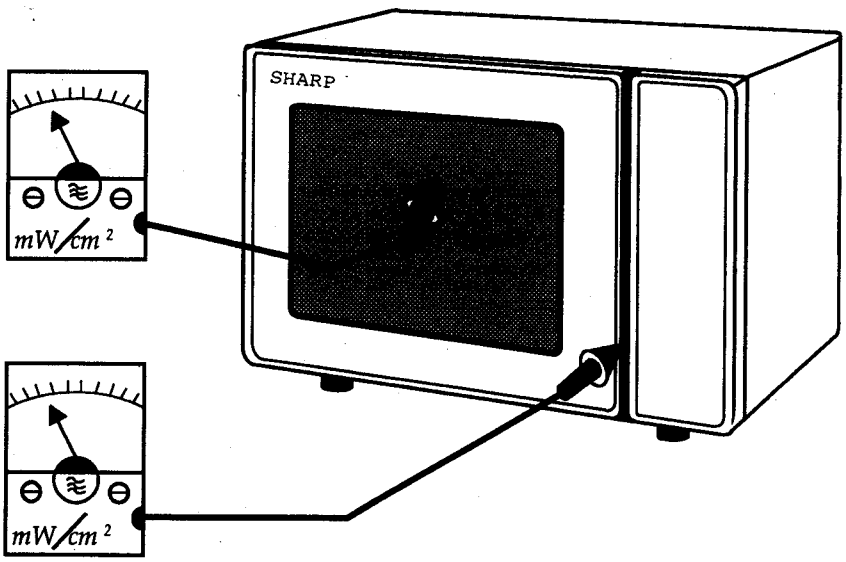
REQUIREMENT

The safety switch must prevent microwave radiation emission in excess of 5mW/cm2 at any point 5cm or more from external surface of the oven.

PREPARATION FOR TESTING:

Before beginning the actual test for leakage, proceed as follows;

1. Make sure that the test instrument is operating normally as specified in its instruction booklet.
   Important:
   Survey instruments that comply with the requirement for instrumentations as prescribed by the performance standard for microwave ovens must be used for testing.
   Recommended instruments are:
   NARDA 8100
   NARDA 8200
   HOLADAY HI 1500
   SIMPSON 380M
2. Place the oven tray into the oven cavity.
3. Place the load of 275 ± 15ml of water initially at 20 ± 5°C in the centre of the oven tray. The water container should be a low form of 600 ml beaker with inside diameter of approx. 8.5cm and made of an electrically non-conductive material such as glass or plastic.
   The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
4. Close the door and turn the oven ON with the timer set for several minutes. If the water begins to boil before the survey is completed, replace it with 275ml of cool water.
5. Move the probe slowly (not faster that 2.5cm/sec.) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.



Microwave leakage measurement at 5 cm distance

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED
2. CLOCK APPERAS ON DISPLAY

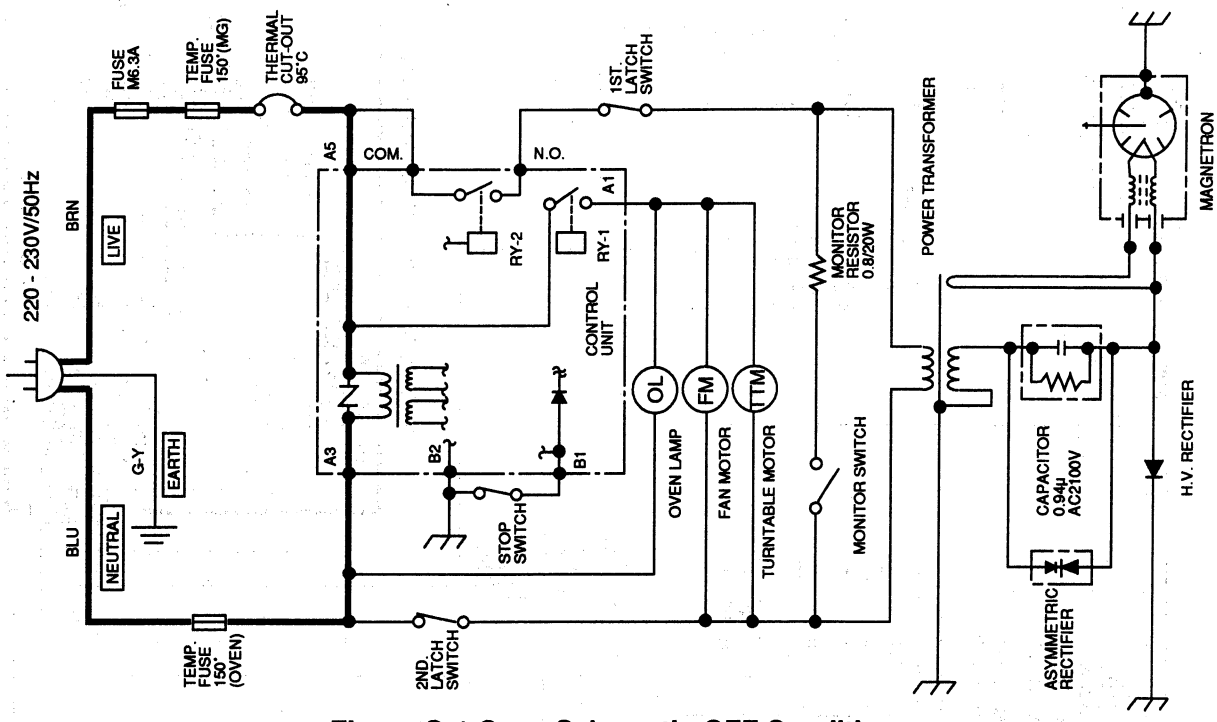


Figure O-1 Oven Schematic-OFF Condition

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED
2. COOKING TIME PROGRAMMED
3. START KEY TOUCHED

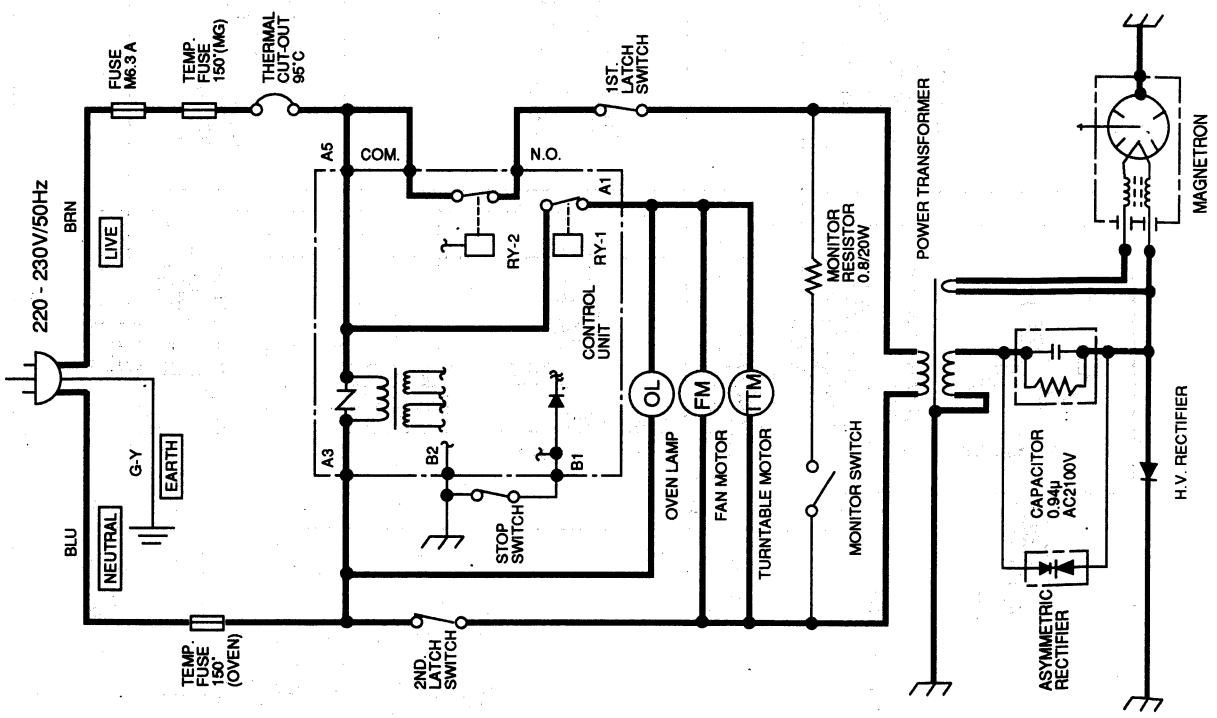


Figure O-2 Oven Schematic-ON Condition

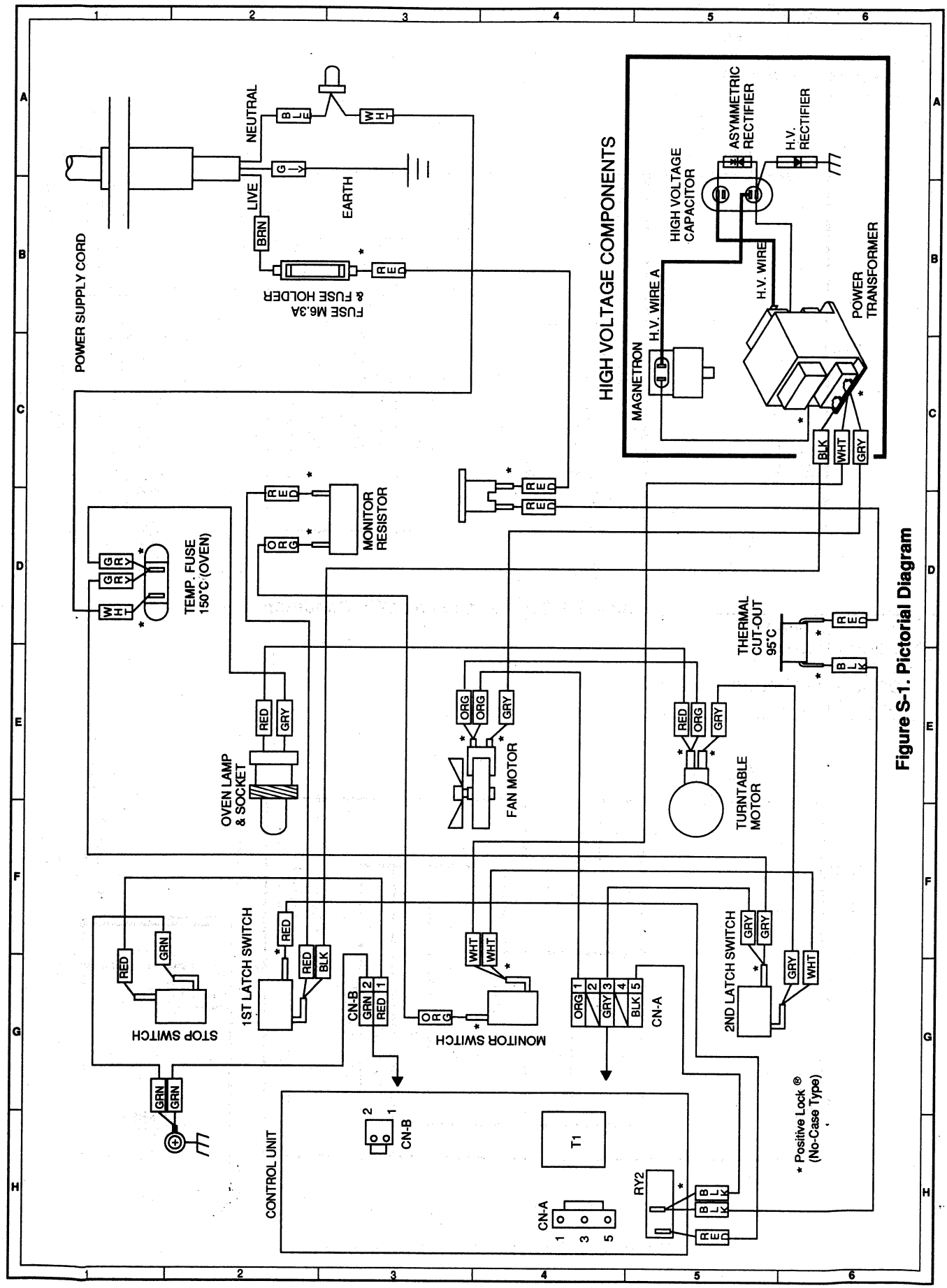


Figure S-1. Pictorial Diagram

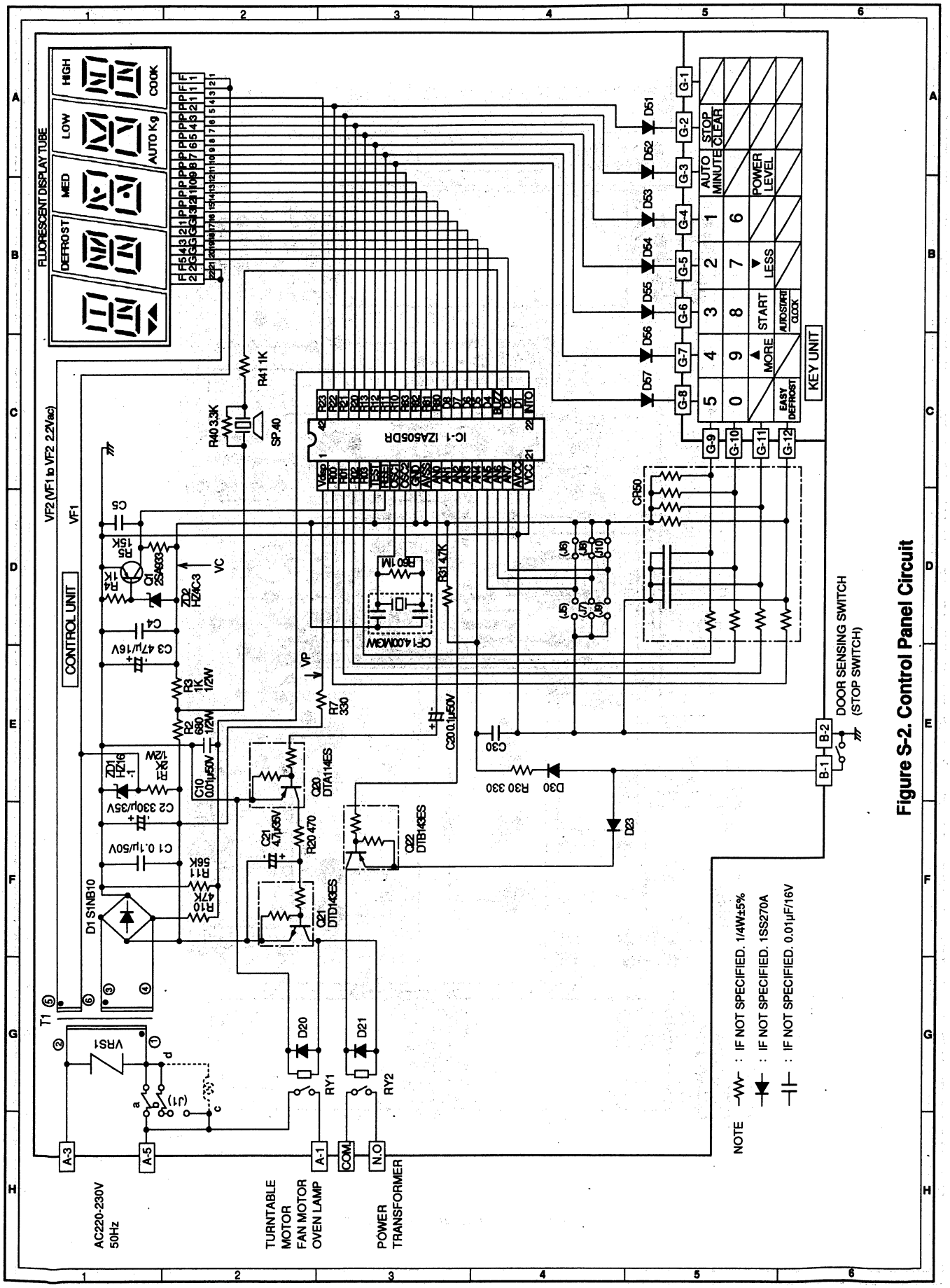


Figure S-2. Control Panel Circuit

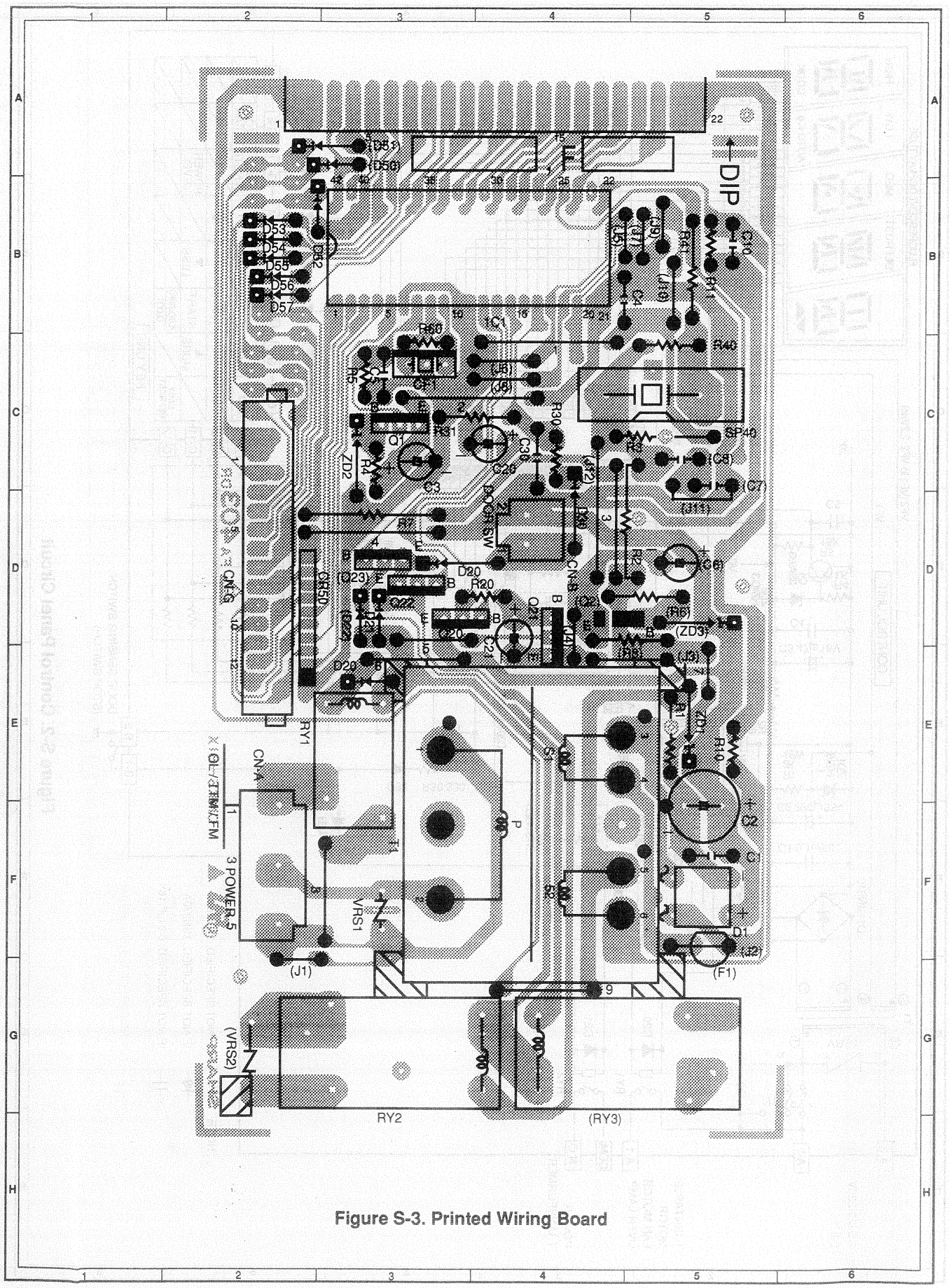


Figure S-3. Printed Wiring Board

PARTS LIST

Note: The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
		ELECTRIC PARTS		
1- 1	QSW-MA110WRE0	Stop switch	1	AK
1- 2	RMOTEA265WRE0	FAN MOTOR	1	AZ
1- 3	RTHM-A072WRE0	Thermal cut-out 95°C	1	AM
1- 4	QSW-MA110WRE0	1st. latch switch	1	AK
1- 5	QSW-MA111WRE0	Monitor switch	1	AK
1- 6	QSW-MA110WRE0	2nd. latch switch	1	AK
1- 7	RR-WZA003WRE0	Monitor resistor 0.8 OHM 20W	1	AF
1- 8	FH-DZA044WRK0	H.V. rectifier assembly	1	AW
1- 9	RC-QZA126WRE0	High voltage capacitor	1	AX
1-10	QACCVA061WRE0	Power supply cord	1	AY
1-11	QFS-C0019WRE0	Fuse M6.3A	1	AC
1-12	QFS-TA013WRE0	Temp. fuse 150°C (MG)	1	AG
1-13	QFS-TA013WRE0	Temp. fuse 150°C (OVEN)	1	AG
1-14	QSOCLA011WRE0	Oven lamp socket	1	AH
1-15	QFSHDA002WRE0	Fuse holder	1	AE
1-16	RLMPTA028WRE0	Oven lamp	1	AK
1-17	RMOTDA173WRE0	Turntable motor	1	AX
1-18	RTRN-A376WRE0	Power transformer	1	BS
1-19	RV-MZA195WRE0	Magnetron	1	BM
		CABINET PARTS		
2- 1	GCABUA422WRP0	Outer case cabinet	1	BC
2- 2	GDAI-A236WRW0	Bottom plate L	1	AN
2- 3	GDAI-A237WRW0	Bottom plate R	1	AQ
2- 4	GLEGPA023WRE0	Foot	2	AB
		CONTROL PANEL PARTS		
3- 1	CPWBFA558WRK0	Control unit	1	BM
3- 1A	QCNCMA234DRE0	3-pin connector (A)	1	AC
3- 1B	QCNCMA275DRE0	2-pin connector (B)	1	AB
3- 1C	QCNCWA030DRE0	12-pin connector (G)	1	AE
3- 1D	RV-KXA056DRE0	Fluorescent display tube	1	AX
3- 1E	PCUSGA381WRP0	Cushion	1	AG
C1	RC-KZA087DRE0	Capacitor 0.1 uF 50V	1	AB
C2	VCEAB31VW337M	Capacitor 330 uF 35V	1	AC
C3	VCEAB31CW476M	Capacitor 47 uF 16V	1	AA
C4-5	VCKYD11CY103N	Capacitor 0.01 uF 16V	2	AH
C10	VCTYF31HF103Z	Capacitor 0.01 uF 50V	1	AB
C20	VCEAB31HW104M	Capacitor 0.1 uF 50V	1	AM
C21	VCEAB31VW475M	Capacitor 4.7 uF 35V	1	AA
C30	VCKYD11CY103N	Capacitor 0.01 uF 16V	1	AH
CF1	RCRS-A012DRE0	Ceramic resonator (CST4.00MGW)	1	AD
CR50	RMPTEA011DRE0	CR array	1	AL
D1	RSRCDA013DRE0	Diode bridge(S1NB10)	1	AG
D20-21	VHD1SS270A/-1	Diode (1SS270A)	2	AA
D23	VHD1SS270A/-1	Diode (1SS270A)	1	AA
D30	VHD1SS270A/-1	Diode (1SS270A)	1	AA
D51-57	VHD1SS270A/-1	Diode (1SS270A)	7	AA
IC1	RH-IZA505DRE0	LSI	1	AT
Q1	VS2SA933S//-3	Transistor (2SA933S)	1	AB
Q20	VSDTA114ES/-3	Transistor (DTA114ES)	1	AB
Q21	VSDTD143ES/-3	Transistor (DTD143ES)	1	AC
Q22	VSDTB143ES/-3	Transistor (DTB143ES)	1	AC
R1	VRD-B12HF202J	Resistor 2k ohm 1/2W	1	AB
R2	VRD-B12HF681J	Resistor 680 ohm 1/2W	1	AA
R3	VRD-B12HF102J	Resistor 1k ohm 1/2W	1	AA
R4	VRD-B12EF102J	Resistor 1k ohm 1/4W	1	AA
R5	VRD-B12EF153J	Resistor 15k ohm 1/4W	1	AA
R7	VRD-B12EF331J	Resistor 330 ohm 1/4W	1	AA
R10	VRD-B12EF473J	Resistor 47k ohm 1/4W	1	AA
R11	VRD-B12EF563J	Resistor 56k ohm 1/4W	1	AA
R20	VRD-B12EF471J	Resistor 470 ohm 1/4W	1	AA
R30	VRD-B12EF331J	Resistor 330 ohm 1/4W	1	AA
R31	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
R40	VRD-B12EF332J	Resistor 3.3k ohm 1/4W	1	AA
R41	VRD-B12EF102J	Resistor 1k ohm 1/4W	1	AA
R60	VRD-B12EF105J	Resistor 1M ohm 1/4W	1	AA
RY1	RRLY-A080DRE0	Relay (OJ-SH-124LM)	1	AG
RY2	RRLY-A081DRE0	Relay (VRB24)	1	AL
SP40	RALM-A014DRE0	Buzzer (PKM22EPT-CA)	1	AG

Note: The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
T1	RTRNPA082DRE0	Transformer	1	AX
VRS1	RH-VZA032DRE0	Varistor (10G471K)	1	AH
ZD1	VHEHZ161///-1	Zener diode (HZ16-1)	1	AA
ZD2	VHEHZ4C3///-1	Zener diode (HZ4C-3)	1	AA
3- 2	DUNTKA575WRK0	Key unit assembly	1	BA
3- 3	GMADIA054WRF0	Display window	1	AE
3- 4	HPNLCB104WRF0	Control panel frame	1	AS
3- 5	JBTN-A863WRF0	Open button	1	AK
3- 6	MSPRCA050WRE0	Open button spring	1	AB
3- 7	XEPSD30P10XS0	Screw; Control unit mtg.	2	AA

OVEN PARTS

4- 1	FROLPA050WRK0	Roller stay	1	AT
4- 2	NTNT-A034WRF0	Turntable	1	AM
4- 3	NFANJA029WRE0	Fan blade	1	AL
4- 4	PDUC-A535WRW0	Fan duct	1	AQ
4- 5	LANGQA343WRP0	Fan thermo angle	1	AK
4- 6	PHOK-A062WRF0	Latch hook	1	AP
4- 7	LANGQA365WRW0	Light mount plate	1	AQ
4- 8	LBNDKA038WRP0	Capacitor holder	1	AF
4- 9	FHNG-A096WRT0	Lower oven hinge	1	AK
4-10	FOVN-A283WRT0	Oven cavity	1	BF
4-11	GLEGPA051WRF0	Leg	1	AK
4-12	PCUSGA389WRP0	Cushion	1	AG
4-13	LANGTA298WRW0	Chassis support	1	AQ
4-14	MHNG-A337WRT0	Upper oven hinge	1	AH
4-15	MLEVPA206WRF0	Switch lever	1	AL
4-16	PCOVPA276WRE0	Waveguide cover	1	AL
4-17	PCOVPA277WRF0	HVC cover	1	AL
4-18	PCUSGA208WRP0	Rubber cushion	1	AC
4-19	LANG-A044WRW0	Air guide	1	AL
4-20	PCUSUA193WRP0	Cushion	1	AB
4-21	PCUSGA339WRP0	Cushion	1	AC
4-22	PCUSUA235WRP0	Exhaust Cushion	1	AF
4-23	PCUSUA376WRP0	Cushion	2	AG
4-24	PFILWA041WRE0	Lamp filter	1	AF
4-25	PPACGA097WRE0	O-Ring	1	AG

DOOR PARTS

5	DDORFA627WRK0	Door assembly	1	BL
5- 1	FDORFA260WRT0	Door panel	1	BD
5- 2	GCOVHA302WRF0	Choke cover	1	AS
5- 3	GWAKPA281WRF0	Door frame	1	AW
5- 4	HPNL-A470WRR0	Door screen	1	AX
5- 5	LSTPPA122WRF0	Latch head	1	AM
5- 6	MSPRTA084WRE0	Latch spring	1	AB
5- 7	PSHEPA333WRE0	Sealer film	1	AE

MISCELLANEOUS

6- 1	TINS-A403WRR0	Instruction book	1	AN
6- 2	FW-VZB238WRE0	Main wire harness	1	AX
6- 3	QW-QZA183WRE0	High voltage wire A	1	AM
6- 4	LBNDKA080WRE0	Wire holder B	1	AD
6- 5	QTANP0020YBE0	Closed end terminal	1	AA
6- 6	TSPCNB905WRR0	Rating label	1	AH
6- 7	UKOG-A007WRE0	Touch up paint	1	AT
6- 8	TCAUHA055WRR0	Caution label	1	AF
6- 9	TLABSA022WRR0	Fuse label M6.3A	1	AG
6-10	FW-VZA910WRE0	Switch harness	1	AH

SCREWS, NUTS AND WASHERS

7- 1	XFPSD30P10000	Screw; 3mm X 10mm	1	AA
7- 2	XBTSD40P08RV0	Screw; 4mm X 8mm	2	AA
7- 3	XFPSD30P08000	Screw; 3mm X 8mm	2	AA
7- 4	XVPSD40P20000	Screw; 4mm X 20mm	1	AA
7- 5	XOTSD40P12000	Screw; 4mm X 12mm	9	AA
7- 6	XHTSD40P08RV0	Screw; 4mm X 8mm	1	AA
7- 7	LX-WZA028WRE0	Washer	1	AB
7- 8	LX-CZ0052WRE0	Special screw	2	AA
7- 9	LX-EZA045WRE0	Special screw	5	AB
7-10	XOTSE40P08000	Screw; 4mm X 8mm	4	AA

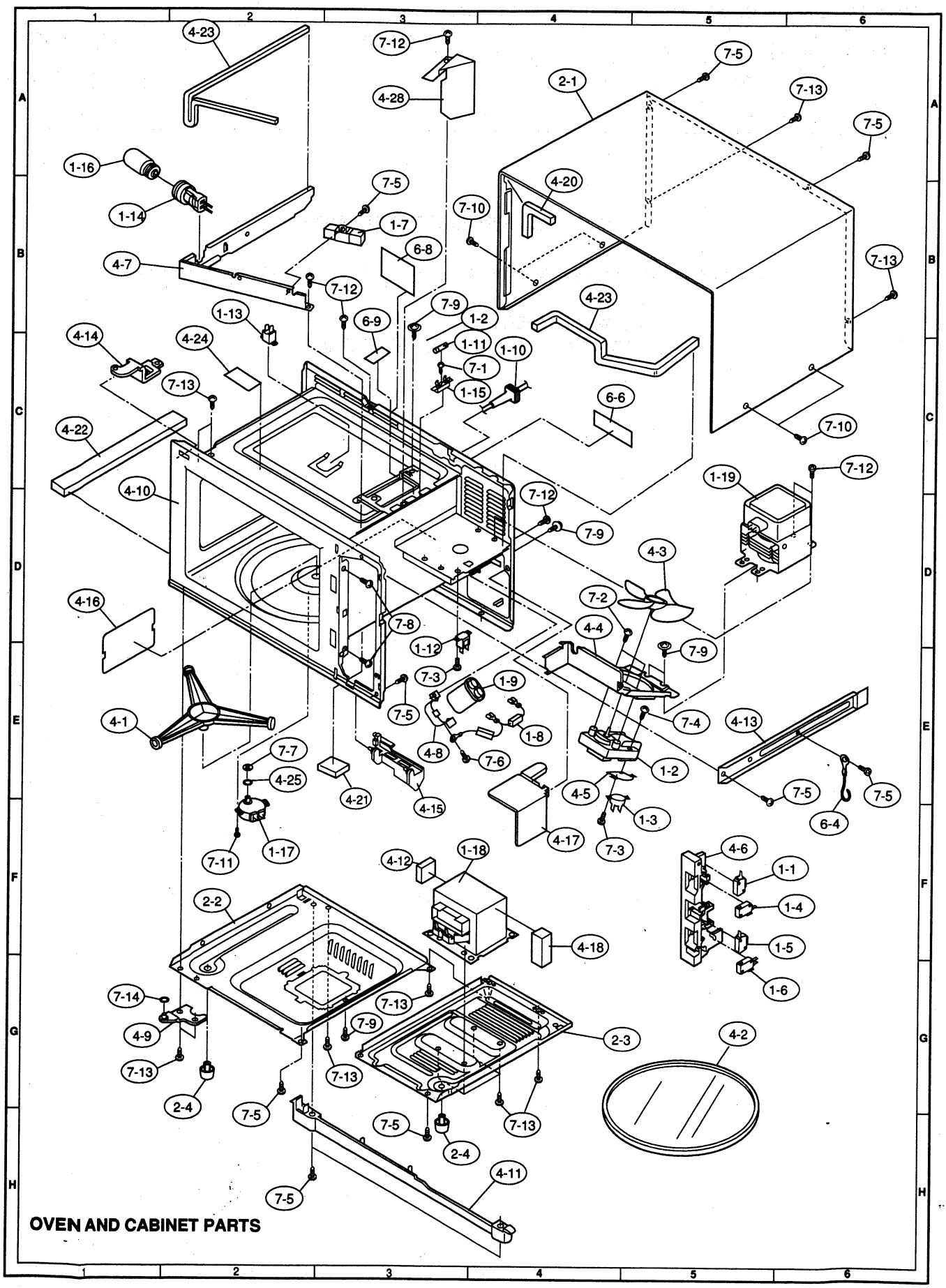
Note: The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
7-11	XFPSD40P08K00	Screw; 4mm X 8mm	1	AA
7-12	XFPSD40P08000	Screw; 4mm X 8mm	5	AA
7-13	XOTSD40P12RV0	Screw; 4mm X 12mm	13	AA
7-14	XWHNZ40-10080	Washer; 4mm x 1.8mm	1	AB

HOW TO ORDER REPLACEMENT PARTS

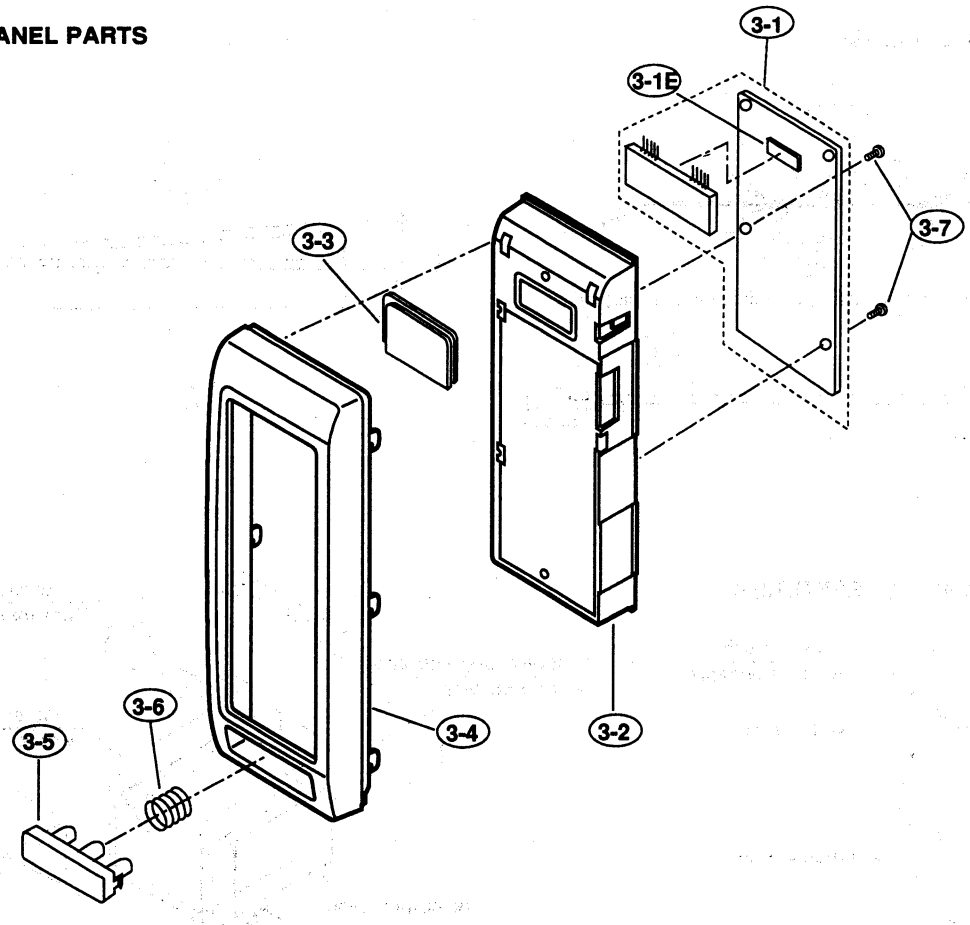
To have your order filled prompty and correctly, please furnish the following information.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

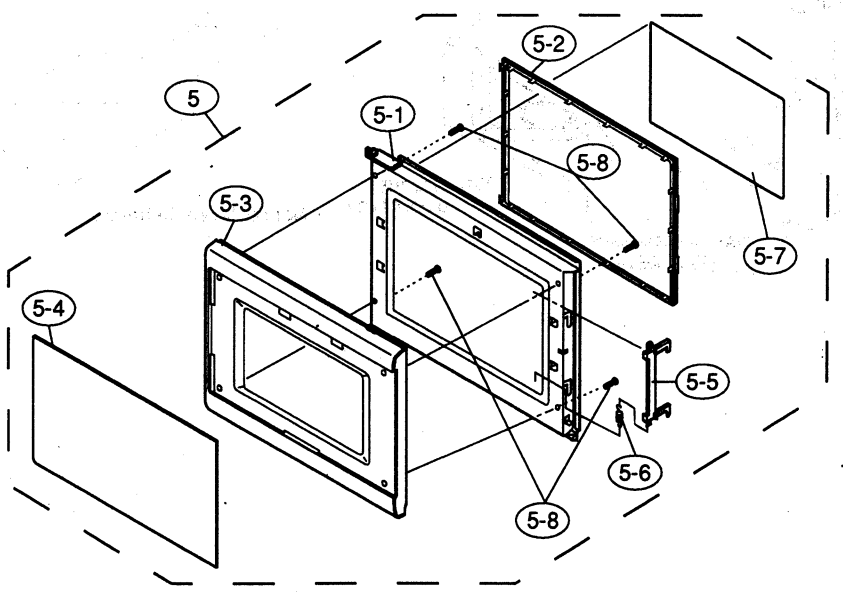


OVEN AND CABINET PARTS

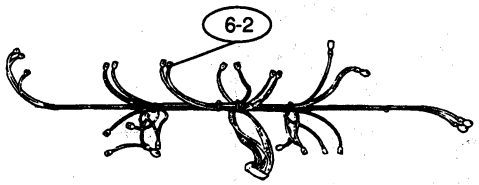
CONTROL PANEL PARTS



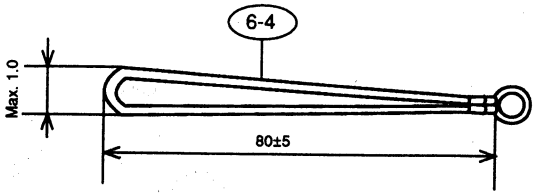
DOOR PARTS

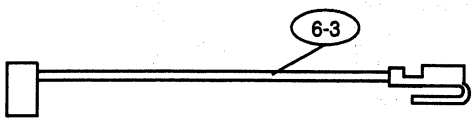


MISCELLANEOUS

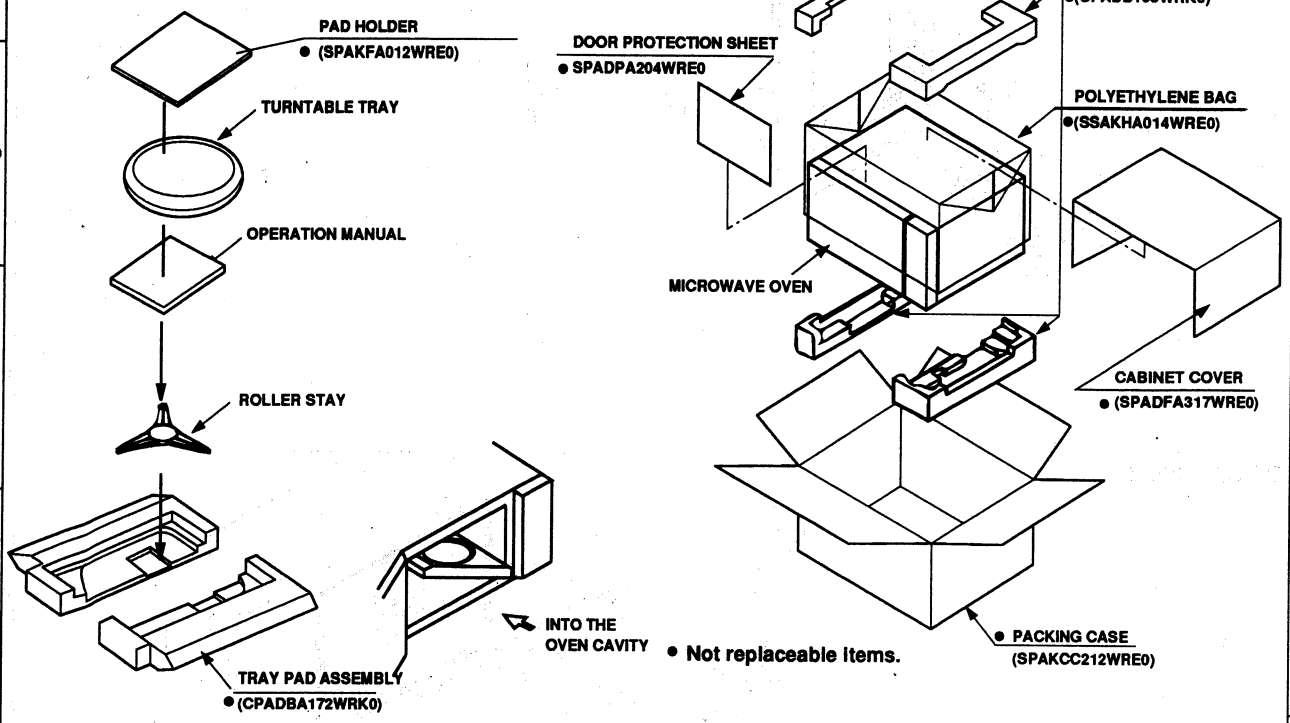


Actual wire harness may be different than illustration.





PACKING AND ACCESSORIES



● Not replaceable items.